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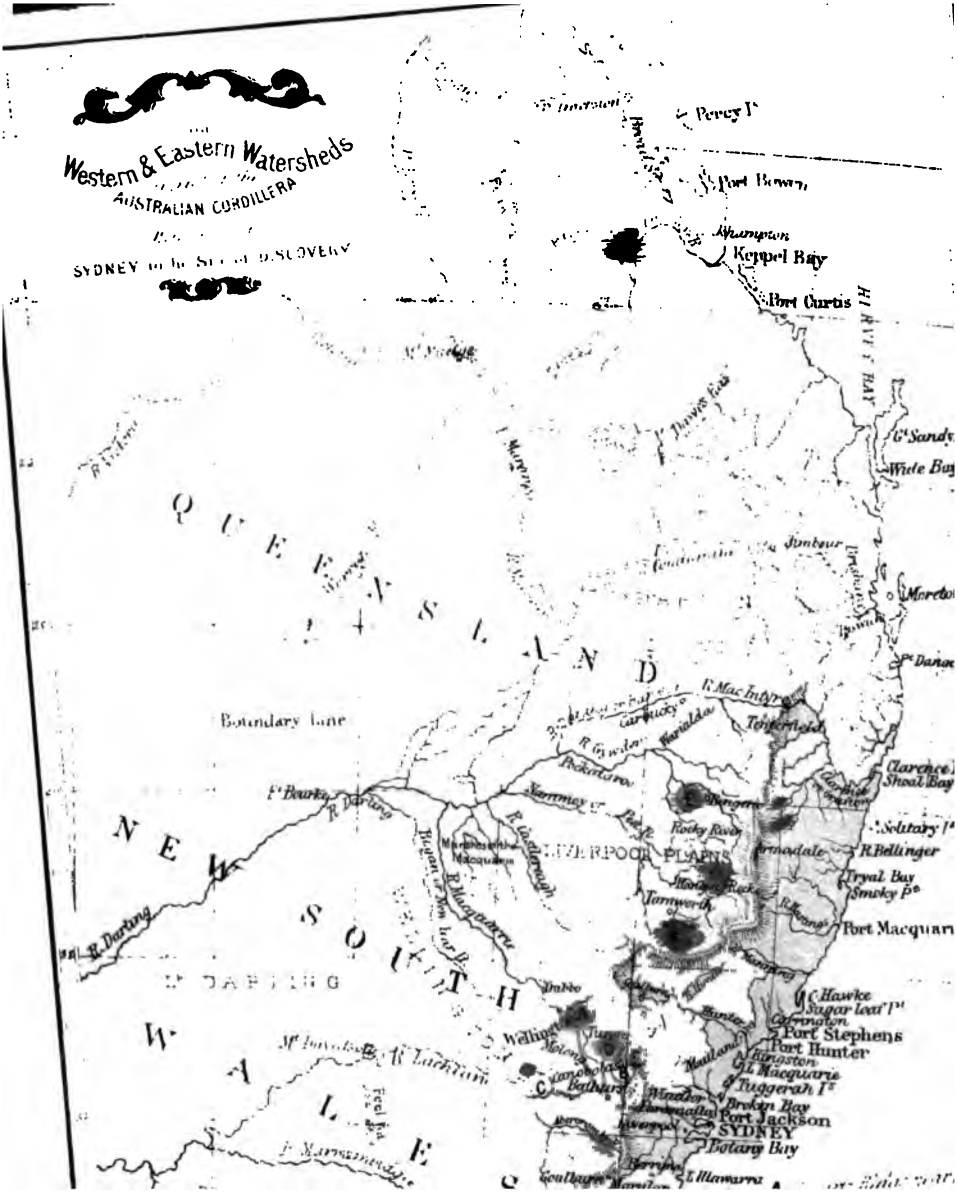
THE

DISCOVERY AND GEOGNOSY

OF

GOLD DEPOSITS IN AUSTRALIA.


Western & Eastern Watersheds
Australian Cordillera
Sydney to the Site of Discovery
Percy I.
Port Bowen
Rockhampton
Keppel Bay
Port Curtis
Hervey Bay
Gt. Sandy
Wide Bay
Moreton
Pt. Danger
Q U E E N S L A N D
Boundary Line
Ft. Bourke
R. Darling
N E W S O U T H W A L E S
Darling
R. Mac Intyre
Tenterfield
R. Gwydir
Liverpool Plains
Tamworth
Armadale
Clarence R.
Shoal Bay
Solitary Is.
R. Bellinger
Tryal Bay
Smoky Pt.
Port Macquarie
R. Macquarie
R. Castlereagh
Dubbo
Wellington
Bathurst
R. Lachlan
C. Hawke
Sugar Loaf Pt.
Port Stephens
Port Hunter
Maitland
L. Macquarie
Tuggerah Is.
Broken Bay
Port Jackson
SYDNEY
Botany Bay
Goulburn
L. Illawarra

THE

GOLD DEPOSITS

IN

AUSTRALIA;

THEIR

DISCOVERY, DEVELOPMENT AND GEOGNOSY,

WITH

A DISQUISITION ON THE ORIGIN OF

Gold in Placer-Deposits and in Quartz-Veinstones.

BY

SIMPSON DAVISON,

MEMBER OF THE PHILOSOPHICAL SOCIETY OF NEW SOUTH WALES, AND
LATE ASSOCIATE OF THE GOVERNMENT-RECOGNISED GOLD DISCOVERER EMPLOYED AS
FIRST CROWN COMMISSIONER FOR EXPLORATION OF GOLD FIELDS.

WITH MAPS AND DIAGRAMS.

SECOND EDITION.

> "When two theories run parallel to each other, and each explains a great many facts in common with the other, any experiment which affords a crucial instance to decide between them or by which one or the other must fall is of great importance."
>
> *Herschel's Discourse.*

~~200. a. 61.~~

LONDON:
LONGMAN, GREEN, LONGMAN, AND ROBERTS.
1861.

188. e. 49.

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TO

THE MEMBERS OF

The British Association

FOR

THE ADVANCEMENT OF SCIENCE,

THE AUTHOR

MOST RESPECTFULLY DEDICATES THIS VOLUME,

IN TESTIMONY OF

HIS HIGH APPRECIATION OF

THE OBJECTS OF THE INSTITUTION.

WHICH HE BELIEVES TO BE

THE DETECTION AND ERADICATION OF

PSEUDO-SCIENCE AND THE ERRORS OF IGNORANCE,

NO LESS THAN

THE DISCOVERY AND PROMOTION OF

SCIENTIFIC TRUTH.

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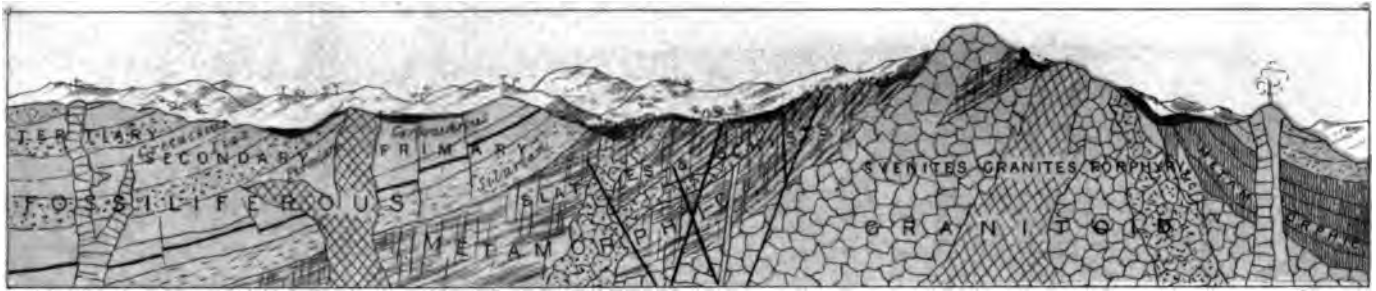
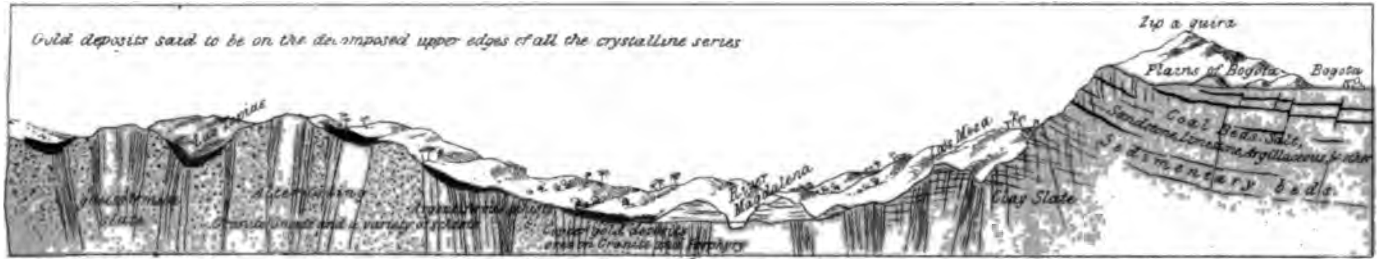
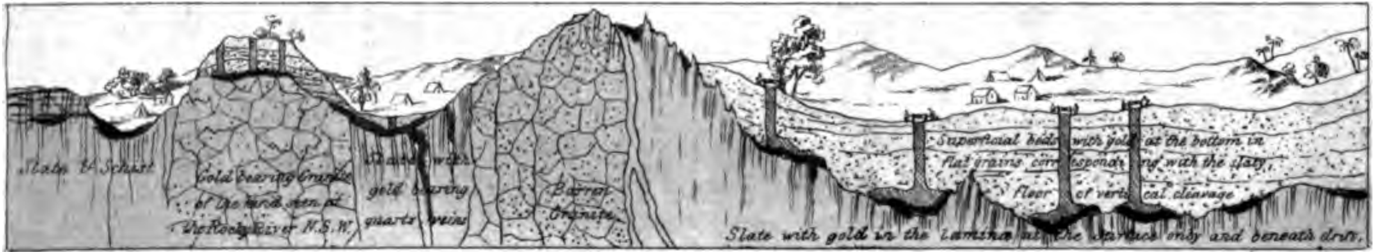


Ideal Section of the earth's crust as usually represented by geologists. The position indicated of gold deposits in patches on the surface of slates, schists, & granites


Gold deposits said to be on the decomposed upper edges of all the crystalline series
Zip a quira
Plains of Bogota
Bogota
Alternating
River Magdalena
Clay Slate
Coal Beds, Salt,
Sandstone, Limestone, Argillaceous
Sedimentary beds

E and W Section of part of South America to illustrate Mr Evan Hopkins's theory of the Vertical structure of the "primary" rocks with the position of the gold deposits indicated on the superficial decomposing edges of the crystalline series.


Slate & Schist
Gold bearing Granite of the kind seen at the Rocky River N.S.W.
Slate with gold bearing quartz veins
Barren Granite
Superficial beds with gold at the bottom in flat grains corresponding with the slaty floor of vertical cleavage
Slate with gold in the Lamina at the surface only and beneath drift.

Ideal Section to illustrate the position of flat grains of gold in situ upon slates and beneath drifts as obtained in California and Australia. Also an auriferous

PREFACE TO SECOND EDITION.

THE Author, in presenting a Second Edition of his work on Gold Deposits and Gold Discovery in Australia, deems that a few words in explanation and apology for an apparent hostility in some parts of the volume towards men of science in general, and towards Sir R. Murchison, Director of the Government School of Mines, in particular, may not be inappropriately offered.

No one can possibly respect men of science more than does the Author. When perfectly satisfied that a dogma set forth by one of the order is truly a scientific induction, he submits himself as reverentially as the most faithful devotee to the idol of his belief; but in the physical sciences to blindly accept and confound with the infallibility of an exact science every provisional hypothesis which may be put forward by a leading man of science (who may yet be extremely deficient in data upon the special subject), is neither rational nor philosophical; and the Author presumes that, when after experimental observations in the field, it is found necessary to oppose any falsely philosophical system, the propounder of one who has gained a position in science as elevated as that occupied by Sir R. Murchison, will be personally indifferent to the mode by which a disputed opinion or a false position may be attacked. "Discourse may want an animated 'No;'" and in this instance the Author trusts that the personalities and hostilities inseparably connected with the questions at issue, may, without being personally offensive, serve the useful purpose of giving suitable animation to legitimate inquiry.

When the Author had returned from California to Australia, and then possessed, as he believed, more empirical knowledge of gold deposits coupled with more previously acquired knowledge of the mineral aspect of the gold-bearing areas of New South Wales, than, perhaps, any other person in the world, he experienced not only the contumely of being silently passed over without a hearing by the State Authorities, who professed to be conducting inquiries as well with reference to the future prospects of gold production in the Colony, as to certain past historical questions connected with the gold discovery of 1851; but while believing this discovery to have been the successful demonstration of his own comparison, induction, and instruction, the Author felt the injustice further aggravated by the local press, which idolatrously proclaimed, in a manner worthy of the idolators of Ephesus, "Great is Murchison, the predictor of Australian gold, and Great is Hargraves, the first demonstrator of his scientific principles." The Sydney journals for several years teemed with hyperbolical assertions that Sir R. Murchison—the Director of the Government School of Mines in England—the Director-General of the Geological Survey of Great Britain—Ex-President of the Geological Society, &c., &c.—already knew and had long before known all about the gold deposits in Australia; and hence it followed that all the Author's extensive explorations over the gold-bearing areas in the interior of Australia, and all his subsequent examinations of the gold deposits in California, with the just inference which he had deduced from this enlarged comparison, had been altogether of no service whatever, and that his companion, the person whom he had urged, and who had in Australia washed out the first dish of earth containing gold, was solely entitled to all the benefits—to all the public acknowledgments, rewards, and honours which resulted were due to a joint labour. The local newspapers, under a form of government lately defunct, commanded in such thundering peals as utterly silenced the still small voice of truthful inquiry—"Fall down and worship the unimpeachable science of Sir R. Murchison, and do humble homage to the great experience of Mr Hargraves, in all that relates to gold deposits in Australia." Under such circumstances, the Author's unostentatious statements to his immediate personal friends in Sydney, that in reality his own practical experience much exceeded that of his late mining associate, and that based upon his own observations in the field, he possessed more true and empirical knowledge of gold deposits in general, and of the mineral aspect of the gold districts of Australia in particular, than did the Director-General of the Geological Survey of Great Britain, and that, as a matter of traditional history, the Author had long been informed of gold in matrix having been frequently obtained near Wellington, before the alleged *first discovery of gold* was said to have been made by his associate while on the way to that district. These plain statements, however, remained comparatively unheard of and unknown by the general public amidst the din of trumpeting which proclaimed Murchison the scientific, and Hargraves the practical, gold-deity to be publicly worshipped by authority of the State. The only apparent reason for this *suppressio veri* being that it did not suit the interest or the convenience of the members of the local Government of the day to give equal publicity to the whole of the true facts.

The Author, since the issue of the first edition, has learnt with infinite satisfaction that the identical conclusion at which he had arrived in California ten years ago, is at length accepted by the very person sent out from England by State authority, as a scientific geologist duly trained and approved of by Sir R. Murchison, Director of the Government School of Mines in England, to pursue at the public charge in Australia precisely the same inquiry relating to gold deposits, which the Author had done previously in Australia, then in California, and again in Australia, at his own private charge, and with the same results. This similar conclusion is lately stated in a letter to Sir R. Murchison from the Government geologist in Victoria after six years of experience and observation on the opened gold-fields of that colony, namely, that the origin of the considerable lumps and large grains of free gold beneath alluvia and upon the slates must be due to some other natural cause than the superior richness of the denuded upper surfaces of the gold-bearing quartz veins. This opinion expresses exactly the Author's first proposition determined in California, of which his letter sent thence with his associate is sufficient proof when it is considered with reference to the geological character and the previous examinations of the particular localities to which it referred in Australia. The Author had then so far satisfied himself by a very close inspection both of the nearly upright quartz veins which penetrate the rocky masses in Australia and in California, and of the surface deposits of gold in free grains spread beneath the drifts and upon the floors of the slates, that the free lumps and large grains of gold beneath alluvia were certainly due to some other natural cause than the denudation of gold-bearing quartz veins, and that the free gold grains were intimately connected with the bed rocks upon which they rested, and that the true question for philosophical inquiry was that of their origin in visible forms in this geological position. The Author having, then, arrived at this conviction, and having observed the connection of the free gold grains with the floors upon which they rested, can now, in proof of it, refer with the highest satisfaction to the circumstance of his having taken advantage of the return to the Colony of his associate to urge upon him the examination in Australia of the slaty, schistose, and granitic bed-rocks already familiar to him in the neighbourhood of quartz veins which he had already examined, and which were not visibly gold-bearing, in addition to his urging the examination of the soil in the vicinity of a certain quartz vein previously known to be of the gold-producing kind.

It is then with no ordinary gratification (when regarded in connexion with this decision of the Government Geologist in Victoria) that the Author has since become cognizant of the fact that he had already been anticipated in an opinion that gold deposits in general were due to an original formation of the metallic grains upon the floors—upon the "upper edges" of the slaty bed rocks (as well as upon the more crystalline rocks), by a gentleman of scientific attainments and great gold-mining experience in South America, Evan Hopkins, Esq., C.E. and F.G.S., for many years manager of the Marmato Gold Mines in New Granada—Mr Hopkins accounting, however, for the apparent fact of an orignal formation of gold grains on the floor by connecting the inquiry with an abstract system of geogony which is peculiarly his own. Mr Hopkins, in his peculiar views, entirely discards the igneous theory of geogony, and even the eruptive origin of the granitoid rocks. In a volume entitled 'The Connexion of Geology and Magnetism,' he has promulgated an electro-magnetic theory, in which the formation of granites, the production of metalliferous veins, and the cleavage planes of slates, are all referred to the slow operations of terrestrial magnetism by a natural process analogous to that which may be produced artificially with the voltaic battery. The gold deposits upon "the decomposing upper edges of slates," and upon "the decomposing surfaces of granites," Mr Hopkins attributes alike to an original formation *in sitû*, by the natural forces just named, of the gold grains beneath alluvia. These theoretical opinions having for the most part been published before the gold-fields in Australia were opened out, and being intended to describe the actual physical conditions of gold deposits as observed in South America, at least entitle the alleged facts and the conjectured natural causes of them to deferential consideration, since they are the result of practical experience and extensive observation.

To distinguish facts from the hypotheses intended to account for them is of the utmost importance. It is often said, in order to evade inquiry respecting the origin of gold deposits, that there are so many theories current, it is impossible to investigate them, when in reality, there are only two cardinal theories which run parallel to each other, each explaining a great many facts in common with the other, namely, the one of Sir R. Murchison, which alleges the large free gold grains beneath alluvia to have been originally imbedded in the quartz veinstones, and the other which alleges their original formation *in situ*, or nearly so, upon the floors where they are now found beneath the drifts.

The scientific geologist previously referred to, as having been sent to Australia by Sir R. Murchison, Director of the Government School of Mines in England, is Alfred Selwyn, Esq., F.G.S., for the last six years employed by the Government as Geologist for Victoria. It is now most gratifying to the Author to find that, after these six years of study and close examination of the gold mines in that colony, both of quartz veins and of placers, this thoroughly trained and scientific geologist, the very pupil and emissary of Sir R. Murchison, the finished scholar of the Government School of Mines in England, the Principal of the Geological Survey in Victoria, the Associate of Professor M'Coy, and Member of the Philosophical Society, and of the Royal Society, and of the Board of Science, all lately established in Melbourne, has at length delivered an opinion so decidedly against the fallacy of Sir R. Murchison, and so completely in favour of the negative opinion of the Author, and it may with justice be said equally in favour of that of Mr Hopkins (for to this extent the Author and Mr Hopkins are agreed) as that of the public declaration dated the 14th of February, 1859, contained in a letter addressed to Sir R. Murchison, and printed in the 'Quarterly Journal of the Geological Society,' 1st May, 1860, page 146, where he candidly states; "*I certainly think, from all I have seen in this* *country, that we must look for some other explanation of the occurrence of our big lumps of gold in the drifts besides the superior richness of the denuded upper surfaces of the veins.*"

To show the full importance of this opinion it may be as well to collate it with the one which it condemns:—

SIR RODERICK MURCHISON.	ALFRED C. SELWYN, ESQ.
Extract from 'Siluria,' date 1854, page 456.	Dated Geological Survey Office, Victoria, 1859.
"The indisputable fact is that the chief quantities of gold, including all the considerable lumps and pepitas having been originally imbedded in the upper parts of the vein-stones have been broken up and transported with the debris of the mountain tops into slopes and adjacent valleys."	"From all I have seen in this country I certainly think that we must look for some other explanation of the occurrence of our big lumps of gold in the drifts, besides the superior richness of the denuded upper surfaces of the veins."

Should any one at this date be disposed to reproach the Author for not having found gold in certain goldless quartz-veins in Australia when he searched them prior to 1851, he may now with triumph refer them to the fact that, from all he afterwards saw in California, he concluded very decidedly that "we must certainly look to some other cause than the denudation of the quartz-veins to account for the occurrence of gold beneath the drifts and upon the bed rocks," and that in seeking the cause he marked and speculated upon an obvious connexion between the flat gold grains and the vertical slates beneath them, and then, by his written letter, directed the search for gold in placers to be made in Australia, in particular localities, upon the slates, where in 1851, *it was so found upon the slates*, the reader must allow (however he may differ from the complete system which the Author has endeavoured to propound) that this induction—the Author's counter-theory to Murchison's in its broadest sense—was, in truth, founded upon "a crucial instance" which decides between them, and which Sir R. Murchison's own agent has at length confirmed, as far as a negation of the abrasion doctrine. This in its simplicity is the basis of the counter-theory, for which the facts have to be admitted, and the natural causes have to be assigned, by the scientific body, before any dogmatic assertion of indisputability ought to be uttered.

Mr Selwyn further continues, in the same communication, to differ from both Sir R. Murchison and from the Rev. W. B. Clarke, with respect to the doctrine of the gold-bearing quartz-veins having been originally formed by the *sublimation of ascending mineral vapours*, in the following terms: "It seems to me very difficult to believe that the position of the gold, as we now find it, in the solid 'quartz reefs' and sometimes completely enveloped in crystalline quartz, is entirely due to sublimation," and then Mr Selwyn imploringly adds, in this notable address to his geological chieftain, "I should be very glad to learn what is now the generally received opinion on the subject of the formation and filling of mineral veins." The Author of this volume very heartily joins Mr Selwyn in the desire to be informed what is now the generally received opinion in England of men of science generally, and especially what is now the opinion of Sir Roderick Murchison, the author of 'Siluria,' and the Director of the Government School of Mines in England, on the subject of the formation of gold in quartz-veins as well as in placers. *We pause for a reply.*

Geologists have long been divided into the two orders of Plutonists and Neptunists, and modern chemists can practically produce metals from mineral substances, with nearly equal facility, by the application of either fire or water—by either the wet way or the dry way—by either melting the ore or by causing electro-deposits from cold aqueous solutions—and the metal so produced severally by each method cannot be distinguished from the other. It is almost a fundamental necessity, in an inquiry concerning the formation of the granitoid rocks, the origin of gold, and the infilling of metalliferous veins, as well as for the purpose of describing the actual conditions of them, to start from one or other of these two abstract systems of geogony, namely, either from the igneous theory—the theory of the reaction of the earth's interior upon its surface—or from the antithetical theory of a continuous slow process, unattended with either incandescence or eruptions—to regard the great basis of granite as having had an igneous, plutonic, or primordial volcanic origin, or otherwise, as yet continuing to be undergoing formation by a slow process like that of the voltaic battery. The Author, in speculating on the origin of gold in placers, has certainly ranged himself on the more numerous and stronger side of geologists, and with those high authorities in the physical sciences—Humboldt, De la Beche, Murchison, &c.—in considering granites as eruptive and as igneous rocks, but Mr Hopkins in speculating on the origin of gold beneath the drifts, *in situ* "on the upper edges of slates," "on the surfaces of schists, gneiss, and granites," connects this particular subject with a more enlarged inquiry, in which he entirely rejects the igneous theory of geogony. Mr Hopkins does not even regard granites as being *eruptive* rocks. His theory of the formation of gold on the bed rocks and beneath alluvia is, that the metal has grown from the floor after the manner of an efflorescence, the slates and the granites beneath being, as he considers, the source, the producing rocks, whence the golden atoms have accreted on the surface into large grains, and that the gold-bearing quartz-veins, whence some of the gold grains may have been drifted, are only very partially the source of the derivation of the free gold grains beneath the drifts. The Author has stated in the first edition, that in California the theory of a slow formation of gold upon the slates occupied his attention as the only one which, in his own mind, oscillated with the theory of its having been melted there, and notwithstanding that his own opinions upon the whole have been given in favour of the melting process, he would now merely do Mr Hopkins the justice to state that, though he (the Author) was then unacquainted with his (Mr Hopkins) views, and that, as he has in this volume invariably connected the names of persons with the principles which they have originated or maintained, he can here candidly admit the prior claim of Mr Hopkins to having urged on the consideration of the scientific world the fact of an origination of gold upon the floors of slate, schist, and granite bed-rocks—the "primary series" of his terminology—in contradistinction to the derivation of the metallic grains from the denuded upper surfaces of veinstones. The diagrams in the frontispiece will give some idea of Mr Hopkins's view of the vertical and meridional structure of the primary rocks, as well as of the more commonly received geological system, and of the position in which the gold deposits are found in California and in Australia.

The reader is reminded that in using the popular term "melted" respecting granites and gold, the Author never intends to convey the meaning as a generality that the metal has been *melted out of the solid rock* at the surface, or that the so-called igneous rocks, having originally been solid, have from that solid state been rendered plastic by the application of heat. The question of incandescence is one connected with the constitution of the globe, and the origin of granites and other so-called igneous rocks, is a part of this fundamental question of geogony. It has lately been ingeniously discussed (by those who admit the granitoid rocks to have been erupted in a plastic state) that the plastic state may have been produced solely by the threefold operation of water, pressure, and *heat below redness*, but the Author believes that upon this very question of temperature, the evidence which is afforded by gold itself brings important collateral testimony in favour of such rocks having been originally above the temperature of incandescence when erupted in a plastic state. The incandescent theory of geogony and of the origin of granites is not, however, the Author's *speciality*, but an induction accepted by many of the highest authorities in geology, and adopted as a fundamental proposition by the Author in his investigation of the origin of gold in placers.

The terminology employed by explorers to express their observations on the gold-fields often betrays a theoretical leaning, even when the names of authors are suppressed; thus, when Professor Ansted explored the gold-fields in America, while indulging his own conjecture that the so-called "quartz bands" and the "bands of auriferous slates" are in reality only highly-inclined layers of sedimentary rocks, the nomenclature of Mr Hopkins's theory concerning the vertical and meridional structure of the primary rocks in connexion with gold deposits, is first employed, and then a belief is expressed in the antagonistic and perhaps more generally accepted theory of the metamorphic slates beneath the gold drifts being but tilted sedimentary strata.

The ardour with which well-informed writers on gold will maintain extreme opinions is sometimes highly amusing. The following collation of the opinions of two known scientific gold authorities—the one being a geologist of the igneous persuasion, and the other of the electro-magnetic belief—will afford an instructive example of how the most able men may honestly proceed to investigate natural phenomena, and yet, by starting from contrary fundamental principles, may express opinions widely opposed to each other.

The Rev. W. B. Clarke, M.A. and F.G.S.	Evan Hopkins, Esq., C.E. and F.G.S.
Extract from a paper first printed in Sydney, and presented to both Houses of the Imperial Parliament in 1852, by command of Her Majesty.	Extract from a paper read before the Institute of Civil Engineers in England, and printed by permission of the Council in 1856.
"The notion entertained by some persons who profess geological principles, that gold is still forming, is without a shadow of evidence, and totally contradictory to everything that has been ascertained on the subject. Such a notion can only be entertained by those whose experience is limited, or whose inquiries have just commenced, and who have not had sufficient acquaintance with field geology to be able to read off the testimony of nature."	"A very interesting natural process of the development of gold from granite may be observed in many parts of South America. During a slow process of transformation the gold, towards the surface, becomes visible, and aggregates into grains. Another process of decomposition, and of the liberation of gold from slate, may also be detected near the roots of large trees growing on the edges of auriferous bands. By the aid of the surface moisture, weak solutions of carbonic acid, and the absorbing action of the roots, the rocks become slowly disintegrated and decomposed, whilst the gold contained therein becomes liberated and gradually aggregated into irregular masses, by a process analogous to the formation of metals by the battery.

The alleged indisputable fact of the origin of all large grains of alluvial gold from the abrasion of veinstones is an allegation which, in addition to its having in Australia first retarded the search for gold in placers, has since been productive of much mischief as regards veinstone-mining by public companies—a mischief of which the Great Nugget Vein Gold-mining Company of New South Wales affords a notable instance. In this quartz vein a hundred-pounds lump of gold was found on the surface. "Wherefore," said the concessionaires of the veinstone, "since it is an indisputable fact, according to Sir R. Murchison, the Director of the Government School of Mines in England, that all the considerable lumps and large grains of gold in the alluvia have been denuded from the quartz veins, it is evident that the great nugget vein is the great repository of which the gold-diggers only get the mere outside washings," and a capital of 200,000*l*. was in consequence actually subscribed to work the supposed great magazine—the source and veinstone whence the alluvial gold deposits were alleged to have been indisputably derived. How extremely delusive, and contrary to all experience, were such expectations is now a notorious matter of history. It is true that the text of Sir R. Murchison's book states that the gold-bearing quartz veins decrease in value with the depth; but, then, reasoned the interested proprietary of the quartz vein, suppose the hundred-weights diminish into half-hundred weights, and then into quarters, and so down to a few pounds, the mine will still be tremendously rich—it will be indisputably the Burra-burra of gold mines.

The conjecture which has elsewhere been hazarded, that the slate beneath is itself (not merely the quartz veins which traverse it) the source whence invisible gold atoms have been derived to assume, by a slow process of electro-magnetic agency, the shape of visible free grains on the surface, is, in the Author's opinion, no less fallacious and scarcely less mischievous than the doctrine of the derivation of such grains from abraded quartz veins. It is said by those who take this view, to be a fact proved by experiment, that the slate beneath does contain as much gold as will warrant this conclusion, since, by crushing a few tons of the bed rock taken from the surface of vertically-cleaved slate, a few pennyweights of the metal may be extracted; the true explanation of which extraction, it appears to the Author, is to be found in the fact that the very small flat grains and scales imperceptibly insinuate themselves within the cleavage planes from the surface, and thus escape detection, and yet of course become detected when the whole is crushed. The only other position in the mass where the crushed slate will yield gold will be found, the Author opines, in the close proximity of the nearly upright veinstones. When it is said that in South America "*the undulating surfaces of the slates have gold in visible grains spread regularly over the undulations for many miles*, and that the metal also entwines itself in strings about the roots of trees, thus indicating a slow electro-magnetic origin,"—the Author can only observe that such conditions do not come within his experience of gold deposits. He questions the accuracy of the alleged facts, as a generality, though there may, of course, be exceptional instances and abnormal conditions. Future explorers may safely be left to decide this question. The Author surmises that the statements will be found to have arisen only from a too strong prepossession in favour of a particular system of geogony which warped the judgment and damaged the powers of observation in the mind of the explorer.

The gold deposits unquestionably rest upon those crystalline and slaty rocks (which Mr Hopkins describes as the "primary series") in greater abundance than upon the "Silurian," or any other fossiliferous beds: and though the free grains of metal are found mixed with drifted pebbles, for the most part they are buried beneath them. The gold grains, to a limited extent, may now be deposited upon the Silurian or other fossil-bearing tilted strata, but they have chiefly been originally formed upon, and have probably penetrated vertically through the rocks of the "primary series." The abundance of local drift upon many of the notably rich gold-beds indicates, however, a convulsive movement at the time of their deposition, rather than a slow process of molecular accretion.

But while differing from the opinion of Sir R. Murchison, that the chief quantities of gold deposited beneath the drift have been originally embedded in the quartz veinstones; and from the opinion of Mr Hopkins, that the slate beneath the gold deposits is itself the producing rock whence the golden atoms have been derived to assume visible shapes on the surface, it is gratifying to find that the great practical experience of the latter in South America *attests the same facts,* although attributing them to a different cause. This will be apparent to the reader by collating the two following passages, and bearing in mind that the one regards a melting process, and the other an electro-magnetic process, as the natural cause which has produced the observed phenomena.

Extract from the Author's sixth public letter, page 183, date Feb. 1855.

"Hence cabinet specimens of united gold and quartz are comparatively abundant,—specimens of granite with adhering gold much rarer; but since no adhesions have occurred between liquid gold and the underlying crystalline schists and slates, no cabinet specimens can be produced to illustrate this probable fact of gold (on the surface) having been melted into them: the evidence can only be witnessed in nature when diggers are removing the metal."

Extract from Mr Hopkins's paper read before the Inst. of C.E., page 9, date 1856.

"The reason why it is commonly supposed that quartz is the principal matrix of the gold is because this metal adheres more strongly to quartz than to the ferruginous slate and other gold-producing rocks. Although the quartz veins, enclosed in the series, often produce very large masses of gold, and fine specimens, yet the quantity of gold thus obtained is of small amount as compared to that extracted from the decomposition of the superficial edges of the ferruginous bands of clay and talcose slates. The richest auriferous rocks are so friable, and subject (on being exposed to the air and moisture) to rapid decomposition, as to render it almost impossible to preserve the specimens; for the gold drops off merely from handling."

The reader of this volume will not fail to observe that the Author's letter from California, sent by his associate, was essentially founded upon this fact, and upon his consequent persuasion, that in quantity quartz matrix gold was of inferior importance as compared with that "on the superficial edges of slate," where the metal had seemingly been originally formed, and which yet "dropped off merely from handling." This fundamental fact, so highly important for speculative inquiry and for practical purposes, the Director of the Government School of Mines in England has not even yet appreciated; nor can it be fully appreciated by any one merely from closet study and the examination of cabinet specimens.

The negative evidence which has already been collected by experienced gold-miners is mostly undervalued, always subjects the collectors to be browbeaten with the sophistries of scientific professors, and under the most favourable circumstances must ever fail to bring the investigator either public rewards or public honours, and yet negative testimony is of the highest practical value. It is scarcely less important to know where gold ought not, than to know where it ought, to be sought for, with any good chance of success. The expenditure of either labour or money to procure the metal where experience has taught the explorer not to expect it, is an unwarrantable abuse of means. Thus the Author has been told that gold may yet be found in the sandstones of Sydney Harbour, to which he can only reply that it may yet be found in the chalk of Yorkshire for aught he can prove to the contrary. There are certainly no thanks to be gained by contending that gold will not be found in those places: but it is against experience, it is against theory, it is against probability, to expect it in any available quantity either in chalk or in carboniferous sandstones. It is unjustifiable to expend means, whether of labour or of money, in searching, contrary to all experience, for gold where it cannot be reasonably expected to be found; and then it is a strange perversion of argument to be told, on behalf of disappointed searchers, that gold-searching is all a lottery; that there are no guiding rules; that gold-mining is entirely luck or chance; that theory is worthless for all practical purposes, simply because such persons have defied all previous experience, and anticipated success without admitting the negative testimony of experience, which is as essential as positive facts in the preliminary consideration of employing given means to a proposed end.

It may perhaps be prematurely hazarding generalities to venture the two following propositions—yet the Author is persuaded that they are founded on a broad basis of truth. First, that in the gold-bearing quartz veins there is a ratio between the size of the enclosed metallic grains and the regularity in value and continuation in depth of the auriferous quality of the veinstone,—that is to say, the whiter the quartz and the larger the gold, the less likely to continue of value with the depth; and on the contrary, the smaller the gold, the greater probability of its regularity in yield of metal and of its persistence in depth. The second proposition is, that the more any gold-bearing veinstone is impregnated with base metals—especially with iron oxides and sulphurets—the less likely is the gold to be in large and visible forms, and the more likely is the matrix to continue of value downwards. The auriferous veinstone called Morro Velho, in Brazil, belonging to the St John del Rey Gold-mining Company, may be given as an instance of the latter. No gold grains are visible in this matrix, and the invisible gold in it is intimately associated both with sulphuret of iron and with quartz. The veinstone is now being worked at a depth of 140 fathoms, and though rarely yielding more than half an ounce of gold to the ton of stone, has already yielded in net profits over 500,000*l*. The Great Nugget Vein Gold Mine of New South Wales may be instanced as one of the contrary kind, the gold in the upper part of this veinstone having been found very large and the quartz throughout very white, yet the produce in gold never paid the cost of its extraction, and its working has now long been abandoned.

Since the publication of the first edition, the Author has been informed by a private correspondent that lately "a gold-bearing quartz reef has been discovered on Summer-Hill Creek, and also alluvial gold near the auriferous quartz-vein at Canowindra." Wherefore the Author is recommended to alter the text on this subject in the Conclusion for a second edition. He would, however, now rather point to his observations there as being further confirmed by the late discovery. It is an additional proof to those who may have differed from the Author in regarding the discovery of gold in placers as of greater importance than the discovery of quartz-matrix gold, as well as to those who may have reflected on his not having found gold in the quartz-veins at Goodgood and elsewhere, when sought for before his experience of placer deposits had enabled him to estimate the relative minor importance of the quartz-veins. That some small quantity of gold in alluvia may always be obtained in the vicinity of the latter when visibly gold-bearing, the Author never disputed; but the free grains are not always there in that abundance which entitles the quantity to be called (according to the terminology preferred) a digging—an alluvial deposit—a placer, or a notably rich gold-bed. The Author merely stated that the gold-bearing quartz-veins on Summer-Hill Creek, *if any such there were, yet remained to be discovered.* The reader will remember that the first placer-deposit gold in large quantities was found on Summer-Hill Creek in 1851; that the Creek is crossed by numerous quartz-veins, and yet, until lately, no gold had, during the ten years since elapsed, been found in any one of them. These quartz-veins were carefully examined, and the Creek explored, in the year 1851, by all the principal Government officers, namely, by the Surveyor-General (Sir Thomas Mitchell), by the Government Geologist (Mr Samuel Stutchbury), by the Chief Gold Commissioner (Mr J. R. Hardy), and by the Crown Commissioner for Exploration (Mr Hargraves), and not one of these explorers ever found any gold in the quartz-veins on Summer-Hill Creek. And again, the quartz-veins on this Creek were quarried into and opened out at a very heavy expense by the Colonial Gold-mining Company, who employed labourers under the direction of an experienced gold-mining captain from Brazil in 1851; and yet this Company found no gold whatever in any of them. And lastly of these remarkable gold-searchings in quartz matrix—tens of thousands of experienced gold-miners have repeatedly tried and sought for gold during the last eight years in the various quartz-veins on the Creek, and none of them succeeded in finding any visibly gold-bearing quartz-veins, until at last, in the year of grace 1860, a quartz-reef is actually found on Summer-Hill Creek in which the gold is visible. The practical value of the induction which led to the search in Australia for gold deposits upon the floors of slate in the neighbourhood of quartz-veins not obviously auriferous, is surely not lessened by the late discovery of a gold-bearing quartz-reef at Ophir, and if there be any scientific induction to the contrary, the adverse opinion is more than counterbalanced in the Author's favour by the late confession of Mr Selwyn, the scientific geologist, who has conducted inquiry on behalf of the Government of Victoria.

A professional critic lately delivered an opinion that there is no important antagonism between the Author's theory and that of Sir R. Murchison—the one being, he observes, a useful appendix to that of the other. Upon this opinion the Author may here remark, that considering the igneous theory of Geogony is one adopted in common as a fundamental proposition, and that the illustrious *savant* has reasoned from the postulate of gold being in quartz matrix to a corollary that, therefore, the free gold grains and large lumps, resting upon the "primary rocks" and beneath the drifts, must necessarily have been released from the quartz-veins, and that the Author, on the contrary, has proceeded by an experimental course diametrically opposite, and basing his inquiries upon his own observations, chiefly made on the placer-deposits, started from the very different postulate that the free gold grains beneath the drifts had evidently in their origin been intimately connected with the cleavage of the slaty floors beneath them, as well as with the surfaces of the more crystalline rocks (precisely as Mr Hopkins, after an extensive gold-mining experience and a course of scientific observation in South America, had already done before him), and considering that in the Author's investigations it became from this postulate a subsequent inquiry to establish the relation of placer-deposit gold with gold in quartz matrix, it follows, as a matter of course, that each of the two igneous theories in some respects supplements the other. The Author, however, has from the commencement dissented (as the Government geologist in Victoria now does after a lengthened inquiry) from the "indisputable" allegation as well as (and as a *sequitur* to the first) from the assumed formation of gold in quartz-veins being entirely due to the sublimation of ascending mineral vapours, both of which are prominent positions in the theory of Sir

R. Murchison. The first postulate of the Author's theory relating to placer-deposit gold, namely, that the free grains of metal have an obvious connexion with the slaty floors beneath them (as well as with the more crystalline floors) is one of the most important facts connected with the Australian gold discovery, yet the fact itself remains (as far as appears from any public acknowledgment to the contrary) even at this time, not in any way realized by the scientific enunciator of the alleged "indisputable fact" of the derivation of the chief quantities of gold, including all the large lumps and free grains, from the denuded upper surfaces of quartz-veinstones.

Opinions of the Press.

MINING REVIEW, 18th July, 1860.

"Before entering upon the principal subject matter of his book, Mr Davison gives a lively and vigorous narrative of his personal experience in gold-mining, both in California and in Australia. He claims, and so far as an impartial perusal of his work enables us to judge, he claims justly, the honour of being one of the chief of those explorers whose researches led to the discovery of gold in Australia. The value, however, of Mr Davison's volume, to a large extent, consists in the new and well-defended theory he expounds concerning the origin of gold deposits."

MINING JOURNAL, 28th July.

"Mr Davison's book will well repay perusal, as much valuable information may be obtained; and whether his theory be good or otherwise, some assistance in conducting exploratory operations may be obtained, for the practical observations of an intelligent man are recorded with the greatest care. The book contains just the information which one is likely to take an interest in."

ATHENÆUM, 18th August.

"The Author desires to claim for himself the merit—or a large share in the merit—of having discovered the gold-fields of the Australian continent."

LONDON REVIEW, 1st December.

"The credit due to discoveries like that of Mr Hargraves and Mr Davison must, we believe, always be estimated by the result."

MORNING POST, 28th August.

"Among the great events in the annals of our race, none has been linked with such mighty consequences, immediate and prospective, as the disclosure of the mineral wealth hidden in the gold-fields of Australia. It is therefore not wonderful that on grounds which each considers valid, many should willingly believe themselves entitled to at least a share of the prize. Their several pretensions are discussed in the volume now before us, and to crown the whole, the author of it prefers his demand to be admitted as an additional rival in the goodly band of competitors. The grounds on which the disputants rest their several pretensions have been stated either in their own writings or in the evidence given by some of them before the Courts of Inquiry at Sydney. From an impartial review of the case, it appears that neither the theoretical observations of Sir R. Murchison, nor the scientific researches of the Rev. W. B. Clarke was attended by any practical results, since the official surveyor, whom they were instrumental in setting to work, made no successful explorations. Mr Hargraves was undoubtedly the direct originator and guide of the operations which brought the hidden treasure to light, and he therefore justly received the largest share of the voted reward. Yet it is evident that he was materially assisted, and the almost instantaneous accomplishment of his object greatly promoted, by the previous information and instruction obtained from Mr Davison, to whose services, unfairly kept in the background, no recompense has been awarded. Out of these materials Mr Davison has composed a book, in which he has skilfully combined his own cause with subjects of general interest. His personal narrative is neither obtrusive nor vaunting; he has not exaggerated his own merits, nor overstated his preliminary aid in preparing the way to discovery. The authentic documents which he has interwoven place the final achievement in a clear light as regards its past history, and his speculations will contribute to the development of its future advantages."

DAILY NEWS, 1st November.

"We see no reason why Mr Davison should regard Sir R. Murchison as a scientific antagonist; the theory of the one may be regarded as a useful appendix to that of the other."

SPECTATOR, 4th August.

"The book has very much the air of a blue-book."

SYDNEY MORNING HERALD (New South Wales), 29th October, 1860.

"This is, in some sort, an extraordinary book. It has for its main objects the establishment of two propositions, the first, that the discovery of gold in alluvia, or 'placer deposits,' is a different discovery from that of 'gold in the matrix;' and the second, that the alleged discovery of the former in 1851 was not the work of Mr Hargraves, who was only a 'delegated demonstrator,' but the work of the author. . . . We have no interest in the book one way or the other; but as it is a work likely to be extensively read, and is written with a great deal of talent and judgment in the arrangement of its manifold contents, and is, besides, fortified by documentary evidence, it is not a publication that can be 'pooh-pooh'd' with unconcern, or treated as one undeserving of consideration. As, moreover, much of its contents has been already before the colonial public, and has not been controverted, it has a kind of prestige which carries weight. It is quite true that there are occurrences of gold in deposits which, to the eye, do give the very appearance which Mr Davison maintains is a reality; it does occasionally seem as if the gold had been poured out in a liquid form, covering and cementing pebbles of quartz; but all the experiments yet tried to imitate such gold have failed to realize the supposition. There is still a mystery about it, and, after all, such gold may be the result of electro-deposits. . . . It is now distinctly shown by Mr Davison that the famous placer discovery actually arose from the fact, that gold was known to exist in quartz—and yet what was a real discovery of that, is to be reckoned as nothing! Mr Davison, however, with a candour worthy of him, admits that, though he contends for *his* discovery by his delegate, Mr Hargraves, yet Mr Clarke has a right in a scientific and practical way to be considered the 'first discoverer,' because he not only found gold, but has followed out his finding to a successful issue. . . . The book is well printed in clear type, and is written with a careful disposition of the materials in the author's hands, and with a degree of vigour in the style and command of appropriate and forcible language that place Mr Davison above the common herd of controversialists."

INTRODUCTORY NARRATIVE.

THE first discovery in the Australian Colonies, of gold in the condition of placer deposits, is an event so intimately interwoven with the adventures and associations of my own experience, that, reluctant as I might feel under ordinary circumstances to intrude private history upon public notice, I should in this instance fall short in my endeavour to do impartial justice to the subject, were I, in mistaken modesty, entirely to omit an autobiographical introduction.

But first let me explain what is meant by the term placer deposits. The raw gold of commerce exists in nature chiefly under two conditions. In the one it exists in a visible and metallic state, disseminated through, and encased within, stony matrices, mostly of quartz, which in veins or dykes, or (to use a technical expression more recently adopted) reefs, usually traverse massive rocks of crystalline, schistose, or slaty character in a direction nearly vertical. In the other condition, from which gold is in practice by far the more abundantly obtained, the metal in free grains exists in deposits spread horizontally (that is approximately so, being in hollows, in channels, and on slopes) beneath pebbles, clays, and drift, which rest directly upon the same massive rocks of crystalline, schistose, and slaty structure. Some distinguished writers on theoretical geology have therefore, in speculative and hypothetical essays, assumed, upon very insufficient data, that these placer deposits or gold repositories beneath and in alluvia, owe their origin entirely to a destruction of quartz matrix veinstones and a consequent release of the metallic grains from them, or otherwise from the massive slates, granites, and other crystalline rocks themselves —the assumption respecting the latter being based upon the hypothetical proposition, that the metal when not in veinstones is sometimes originally contained in visible grains within their masses as an integral part of them—such writers conjecturing the destruction to have been in both cases effected either mechanically by water or by other disintegrating agencies. In consequence of this ill-founded assumption, "alluvial gold" has by them been the distinguishing term usually adopted in describing horizontally spread gold deposits not encased in stone, while operative gold miners have generally preferred simply to call them "gold diggings." The designation of "placers," or "placer deposits," introduced by the Spanish miners, and applied to horizontal gold beds in contradistinction to the gold in quartz veinstones, is a term which I think judicious, as giving less countenance than the former to what I regard as the mischievous and erroneous doctrine of the release of such gold grains from quartz matrix veinstones, and from other supposed auriferous matrices which are wholly hypothetical.

I propose, then, to give a brief narrative of those circumstances of my own experience immediately connected with the Australian gold discoveries, more especially with the first discovery of gold in placer deposits, commonly called, *par excellence*, "The gold discovery." The mind of every one, it is often said, receives its first direction and is ever afterwards influenced by the physical conditions which surround it in early life, and it may be that my own juvenile bent took a geological turn in consequence of my native place of Burlington, on the east coast of Yorkshire, being favourable to studies of this nature. The beach of this locality abounds in fossils and agates, and pebble-hunting on the seashore was amongst my earliest recreations. The various strata of sedimentary deposits here appear on the margin of the sea, favourably exposed for observation in vertical sections along the cliffs overlooking the German Ocean. On the north the great cretaceous formation exhibits itself as Flamborough Head, a promontory well known to mariners frequenting those seas; and southwardly, on the coast of Holderness, the geologist perceives both lacustrine beds and those deposits which are theoretically regarded as iceberg drifts, together with various post-tertiary and fossil-bearing strata, all of which afford him interminable data for inquiry. Continuing to the northward towards Whitby, the oolities and the lias succeed in descending order, so that the whole neighbourhood is one of great geological interest. The inquiry thus awakened, and the observations made in early years, were not, I am persuaded, without material and practical use in maturer life.

My father had established the Union Bank at Burlington, but intending me for business, I passed some years from home; finding, however, the occupation uncongenial, I returned to enter the service of the bank, and in due time became authorised to subscribe myself "Sub-Manager." But even with this title of honour I soon began, like Rasselas in the happy valley, to experience "the wants of him who wants nothing," and above all things, to pine after foreign travel and adventure in fulfilment of early predilections.

During the period of engagement with the bank I travelled occasionally on the continent of Europe whenever a limited holiday would admit, and in succession thus visited Scotland, France, Belgium, and the Rhine. In those days, when the facilities of modern travel were unknown, these grateful excursions were by many of my friends looked upon as extraordinary and profitless ramblings.

At length I sought to gratify more completely my desire for foreign adventure, and therefore notified my intention of leaving the service of the bank; my father, though not entirely approving of my wishes, nevertheless consented to them. To combine the gratification of an ardent longing for distant travel with some commercial adventure which might offer a reasonable prospect of ultimate remuneration, now became the great aim. Some people may call this sentiment only a fortune-seeking spirit of adventure, but I am disposed to think that the eagerness to visit foreign lands was of the two the greater motive. I possessed many qualifications for making my adventures at least self-supporting, if not highly remunerative, in a pecuniary point of view. I had received a fair training, both in trade and in finance, — as well in commercial pursuits as in the monetary and credit system of English banking, — besides having acquired that superficial knowledge of agricultural and pastoral affairs which grows with long residence in farming districts. Being then twenty-four years of age and of vigorous constitution, I felt fully resolved to "see the wonders of the world abroad."

The first question which presented itself was where to go to, and in what occupation. The proceeds of a small legacy which had been improved by fortunate investments in railway shares just before the memorable mania had commenced, together with a small additional sum which my brother proposed to venture with me, amounted to about a thousand pounds.

I proposed first going with my brother to London, to meet there, by appointment, a gentleman of our acquaintance, whose business was to purchase soft goods for shipment to Jamaica. We accordingly all met in London ; our friend considerately and courteously invited us to accompany him in his visits to various warehouses when making his selection of goods, and amongst that shrewd and intelligent class—the warehousemen—he inquired of all whom he thought competent to give a valuable opinion, "What part of the world now offers the most advantages for a young man to proceed to upon mercantile adventure?" One strongly recommended Canada, because a large business was doing just then in broad cloths for irregular conveyance across the frontier into the States, and a bright future, he said, was before the British possessions in North America; another expatiated upon the advantages of Hong Kong, which had just before been ceded to the British authorities, and already promised to be the means of opening out an important trade with the vast empire of China; but a third party, whose advice I ultimately acted upon, and which I admit after due trial to have been very sound, spoke to this effect:

"Let your friend take his money only, whatever may be the amount, and invest it in Australia. In these colonies there has lately been a tremendous and unprecedented commercial and monetary crisis, and every kind of property is incredibly depreciated. Sheep, which a year ago were worth two guineas per head, have been sold lately for a shilling each. Cattle, which sold for ten pounds a head formerly, are purchasable now for as many shillings; land and houses are proportionally reduced in negociable value. Now this state of extraordinary depreciation," he continued to say, "cannot last long; the reaction must come; the panic is only temporary; let your friend go there, and invest in anything he chooses—it matters not what—whether he prefer to buy sheep, cattle, or land, he must succeed in realising a fortune as soon as the tide of affairs takes the better turn, as it must inevitably do before long."

This advice seemed to be irrefragable in its argument, and, after full consideration, it was adopted. Now, of all the British settlements of which I had then heard or read of, perhaps Australia was the one of which I knew the least. This was in 1844, when the Australian Colonies were not so popularly known as they subsequently became, especially after the gold discoveries had directed public attention towards them. I had hitherto heard of Australia only vaguely as the Convict Settlement of Botany Bay, and as a great wool-producing country. My impression of it was that of a vast sandy desert, which afforded only a scanty browsing for sheep; and even now, when the novelty of its gold fields has passed away, I sometimes find persons in England who are still impressed with the same erroneous views. For, although it is true that this gloomy description applies to some parts of so immense a territory, yet there are in other parts of Australia vast tracts of country unsurpassed in natural fertility by any other part of the wide world.

I then determined upon going to Australia, and accordingly took a cabin passage in the good ship "Templar," of Liverpool. After an average passage of a hundred and two days, diversified only by the usual incidents of an ultra-tropical voyage, we first saw the quasi-continent of Australia, near Cape Bridgewater, in Bass's Straits. Its aspect was far from encouraging. A low sandy beach, with stunted shrubs, alone met the eye as the vessel stood in close to shore. Again, afterwards, on entering the magnificent harbour of Sydney or Port Jackson, the unfavourable impression was by no means removed, for, although the heights which surround the harbour are on every side covered with a vegetation which imparts a somewhat tropical aspect to the scene, and while the numerous villas which crown every eminence add a great charm to the natural scenery, yet the general view conveys to the beholder at first sight an idea of what it really is, namely, a sterile and rocky soil in the immediate vicinity of the city of Sydney.

For this reason casual visitors to the colony of New South Wales frequently report unfavourably of its general capacity and fertility, however much temporarily charmed with this picturesque harbour. The neighbourhood of the metropolis for many miles inland is, in truth, barren and uninviting to the cultivator of the soil, although in climate dry, healthy, and agreeable. Those persons only who have witnessed the magnificent plains and fertile lands of the interior can form any just conception of the resources of this incipient Empire of the South.

It fell to my lot to be ushered into the illimitable grassy plains of the far interior very shortly after arrival, and this circumstance led to the extensive travel which afterwards became so serviceable in leading to the gold discoveries. Amongst my letters of introduction for New South Wales I had one to Captain D——, an old and influential resident in Sydney, who received me in the kindest and most courteous manner; and on consultation with him it was considered that an investment in sheep or cattle would best meet my wishes. It was then, and in a modified form is yet, the custom to sell in Sydney store and breeding sheep or cattle running upon Crown lands beyond the boundaries of the settled districts at auction by poll, that is to say, at so much per head, with right of the grazing run and the buildings at the station given in. The tenure of the squatter's grazing lands or right of run was that of a yearly tenant *in capite*, or tenant immediately under the Crown, at a fee of ten pounds per annum, without any reference at that time to size of run ; the runs had, nevertheless, distinctly defined boundaries, and the occupier possessed exclusive right against all trespassers. The exclusive right of depasturing stock within the limits of the run being renewed from year to year as a matter of course, and equally as a matter of course were the runs transferred by the Crown Commissioner to any purchaser of respectable character, on recommendation of the vendor of live stock. Such were then the tenures and facilities of transfer of the Crown lands held by the squatters of Australia.

There were offering about this time in the market of Sydney two lots of stock with stations, either of which appeared to be suitable to my means and requirements. One consisted of a thousand and fifty head of horned cattle, the other of five thousand fine woolled sheep. My preferences were for the sheep; so with Captain D——, who acted as my agent in the matter, I attended the sale. We had between ourselves previously fixed upon five shillings per head as the maximum price we were willing to give for these sheep, and they sold for something more,—so that I did not succeed in purchasing them. The lot of horned cattle before mentioned had been offered at auction two days previously, and I had attended the auction rooms as an observer only, not then intending to buy ; there appeared to be no *boná fide* offers in the room, and after finding that the sheep which I had tried to buy had really been sold, I went to inquire after the unsold cattle. Captain D—— soon found out that he knew all the parties concerned in this property, and I obtained most complete information concerning them. Cattle and station both were everything that could be desired, with two very important exceptions. The first exception being that they were situate at a great distance from Sydney, nearly four hundred miles in the interior; and the second, that the aboriginal blacks were numerous and hostile in the neighbourhood. I was not, however, well advised of the consequences of living near hostile blacks, being led to believe that the hazard of personal encounter was the only evil to be feared from them, when in reality the greater mischief consists in the disturbance and consequent depreciation of the herds, but I learnt this only from subsequent hard-earned experience. I then rather rejoiced, as youth will do, at the idea of personal exposure to danger. I received assurances on all hands that the blacks never succeeded in killing any considerable number of cattle, and this information was perfectly true; but then the harass, anxiety, and additional expense in managing and keeping any herd together in the presence of dangerous aboriginals exceeds belief, and can only be fully known to those who have been placed in such trying positions. My advice to inexperienced young men going to the colonies under similar circumstances is to have nothing whatever to do with live stock where the aboriginals are reputed to be troublesome.

The cattle in question had been bred with much expense and care, and the station, which in better times had been formed with great expectations when prices ruled fabulously high, had lately before been the property of an insolvent debtor, who had, like many others, been compelled to succumb to the almost universal insolvency of the colony, and this portion of his assets had been directed to be sold by the assignees for the benefit of creditors. The run was brought under public notice by a grandiloquent advertisement which, in the style of George Robins, described the grass as being equal to the meadows at home, the lagoons as abounding with fish and water-fowl, and the run as being in extent about thirty miles long, through the whole of which ran the never-failing waters of the McIntyre River; and in addition to the run the improvements at the station called "Carbucky" were to be given in to the purchaser of the cattle.

The advertisement looked like a highly-coloured puff—yet in reality it was not so. The run I afterwards found to be quite equal to the description, and indeed much more might have been said in its favour. This eligible lot of cattle I purchased by private sale at fifteen shillings per head, with the pure English bull "Jasper," which had been imported into the colony at an expense of about three hundred pounds, and twelve working oxen, all counted in at the same rate, besides a good dray, two stock horses, the hut and substantial stockyards being given in with the run. The purchase was undoubtedly a most advantageous one, Carbucky being in truth a splendid run of the largest size, abundantly watered and covered with grass.

A Mr N——, to whom I had been introduced in Sydney, possessed a cattle run not very distant from the one I had bought, and Mr N. offered to accompany me, to assist in taking delivery of stock. A Mr John Arnold was also to go up and deliver to me the property on behalf of the vendors. I bought in Sydney, before starting on our journey, two sound young saddle horses at ten pounds each, one for myself, and the other for the accommodation of Mr N——, to travel with. We three then proceeded together to Carbucky in this style, in high spirits, and upon fresh horses. Our route, after landing from the steamer at Newcastle, lay along the valley of the Hunter, and over the Cordillera, or main range, which we crossed at Murrurundi. We then skirted along the edge of Liverpool Plains, and crossed the rivers Nammoy, the Peel, and the Gwydir. There had lately been refreshing rains, and the country looked everywhere green, fresh, and beautiful, to which in my view was added the charm of novelty in the strange vegetation and the ever-changing landscapes.

Without any material incidents we first reached the McIntyre River at Mr Hickey's station. Here we heard the disastrous intelligence of the murder by the blacks of the two white men who had been left in charge of the station of which I was proceeding to take possession. My companions, it seemed, had heard some rumours of the affair on the Peel River, but hoping it might prove to be untrue, they had left me in ignorance of it until the painful intelligence was here confirmed. The stockman in charge of the herd, whose name was Jones, had been absent collecting stray cattle when the catastrophe occurred, and he, together with Mr Claude Arnold, the brother of my travelling companion, joined us here. The cattle of course had all been dispersed and driven off the run so soon as the white men had been murdered. Mr Arnold, under these circumstances, could not possibly deliver the herd to me according to agreement, for it was contracted in writing that the muster and delivery should be completed, and the right of brand transferred to me within twenty-one days after arrival. I could, therefore, easily have thrown up my bargain had I felt discouraged, and many, I imagine, would have done so under such appalling circumstances. There were now the graves of five white men around the hut at Carbucky, all of whom had at different times been cruelly and treacherously murdered by savages. I continued, however, to hear such glowing accounts from the most disinterested persons of the vast superiority of the run, which was said to be the best on the river, and with the understanding that some compromise would have to be made, since the cattle could not certainly be all mustered, I determined upon receiving and taking possession of the purchase. After remaining at Wallangoorah a few days to refresh our horses, we proceeded down the McIntyre towards our destination. We called on our way upon Mr Robert Percy Simpson at Trigamon, and upon Mr George Burgess at Eno, and these two gentlemen long remained the only resident stock proprietors besides myself on the lower McIntyre. Thence we continued our journey, calling at the stations of Yetman, Tucka-tucka, Meadowah, Boonal, and Boogabila; the last-named station being the lowest on the river, next above Carbucky, which was thirty miles distant from it. Boogabila run occupied only one side of the river, and just across the water was an abandoned station called Gundawinda. It was jointly agreed that the cattle should be collected here, and as many as could be conveniently gathered together handed over to me at Boogabila, in order that Mr Arnold's horses and men might then be employed to collect the more distant cattle from the neighbouring runs. I received in one lot here about eight hundred head. Mr Arnold and a stockman then started off to gather in the remainder of the herd. I had hired two stockmen, and these herded the cattle every day on the Gundawinda run, and brought them nightly over the river to be secured in the Boogabila stockyard; but soon after Mr Arnold had started up the river to gather in the remainder of the herd, we proceeded with as many of the cattle as I had got delivered to me for their proper home at Carbucky. By good fortune the dray loaded with twelve months' supplies had been delayed at Boogabila when the murders happened, so that these necessaries, having been valued to me, were available at once for our removal down the river. Nothing could be more gratifying to a grazier's eye than the extensive plains of waving grass over which we passed on our way to the hut and stockyard at Carbucky. The run was thirty miles long, of the very finest pasturage, besides being situate on both sides of the river, in breadth about an average of ten miles, and bounded naturally by impenetrable scrubs. My predecessor had, in his eagerness to secure a large run, built his homestead at the farthest extremity of the run, and thus succeeded in establishing his claim to all this extent of country; but then his greed had operated to his own disadvantage, for had the hut been nearer than thirty miles, probably all these deaths by the violent hands of savages might not have occurred. Beyond Carbucky there existed no white man, and the sun set over an untenanted wilderness, luxuriant in the richest grasses, which nourished no animals of more importance than the wild kangaroos. This extensive and valuable country now awaited occupation by the flocks and herds of enterprising squatters. Mr Arnold, after an absence of six weeks, only brought to Carbucky about one hundred and fifty head more cattle, and so, finally, I agreed to pay him the even sum of seven hundred pounds for the whole concern. As the idea prevailed that the muster had been very imperfect, it was deemed advisable, after the right of brand had been delivered to me, to endeavour to make another collection of the more remote stray cattle. This duty was undertaken by Mr N—— and a stockman named White. They were absent six weeks, and collected about another hundred head of cattle.

But in the meantime rather important events were taking place at Carbucky. After I had been settled there a few weeks, the lately hostile blacks made their first appearance, offering the most friendly protestations. They ascribed the late murders entirely to some distant wild tribes, who, they alleged, were no less their enemies than ours. We found it expedient to appear to believe them, and amicable relations were accordingly established; still we kept them at a respectful distance, never allowing any of them to come within the hut, nor even to cross the river in large numbers, without special permission. This mutual goodwill lasted but a short time before our black allies began to grow saucy again, and to spear cattle. I could not of course submit to these depredations in destroying cattle, and ill-will therefore soon broke out between us. At length, after frequent demonstrations, they made an attack in force upon the hut. In self-defence we fired on them, and two of the blacks were shot dead on the occasion. A few days before this catastrophe the Commissioner of Crown Lands for the district of Liverpool Plains, wherein the run was situate, in returning with half-a-dozen troopers under his command from a short exploration into the interior, called at Carbucky. The party had travelled on this occasion from the most remote cattle runs on the Barwin River, through an unknown country, and by a circuitous route had reached my station on the McIntyre. Their journey from the station they had last left on the Barwin did not exceed a hundred miles distance from Carbucky, the whole intervening space being described by them as a country well grassed but scantily watered. They had ascertained for certainty what had been before only conjectured, that the McIntyre was really a tributary to the Barwin River. Mr Commissioner Mitchell, a son of the Surveyor-General of the same name, in the first place found fault with my not having paid into the hands of Government the licence fee for the current year, which I had not done simply because it was not expedient under the circumstances to be absent from the station, and to ride two hundred miles to him for the express purpose of paying it; in the second place, he said that in consequence of five men having been murdered at Carbucky, the Governor had intimated that no more depasturing licences would be granted for the run; but after having delivered himself thus disagreeably, he appeared to change into a more gracious mood, and at length condescended to address me patronisingly, saying that if I would merely remove the hut and yards to another part of the run, and give the station another name, he, the Crown Commissioner, the lawful authority of this district, would obligingly be my friend, and see that the run was duly secured to me. Neither the lofty officiousness nor the patronising kindness did any real harm, but both provoked intrusive thoughts of the "insolence of office;" and probably, had I then possessed more "colonial experience," instead of moving I should have remained, as some few other squatters did, without any leave from Government, and thus saved the expense of a licence fee; but just having come from England, and being impressed with the most profound respect for constituted authorities, I had no other idea than attending to these official instructions. The aboriginals had been killing cattle for some days before Mr Commissioner Mitchell's arrival, but no sooner had he and his troopers, or mounted border police, gone away, than their depredations were repeated with renewed energy. One evening a stock horse was wounded with a spear without any provocation, but some of the more friendly blacks assuring us that it was the act of one of them who had been expelled from amongst them for it, and that the offence did not meet with the approbation of the rest of his fellows, I was induced to overlook the outrage. We then received information, through some of the women, that a plan had been laid by the blacks to kill all our horses in the night when grazing. In this dilemma we confined them every night in the stock yard, and cut grass or reeds for them to eat. We were again told by the females that they had a design to murder the white men whilst cutting reeds. The final aggression, as I have related, was an attack upon the hut, which led to their discomfiture and departure, attended with the destruction of two of their number, and this climax occurred a few days after Mr Commissioner Mitchell's official visit.

At the other extremity of the run, that is to say, on that part nearest to my next neighbours, the extensive lagoon, or lake of Boobara, was situated. This fine sheet of fresh water, said to be the largest in the northern districts, never failed in the severest droughts, and had been proved to be more reliable in supplying the indispensable element than the river itself. One end of the lagoon was enveloped in impenetrable brigalow scrubs (the brigalow is a kind of acacia); the other extremity reached into the plains, and thus became available as a watering-place for cattle. Boobara was about twenty miles distant from Carbucky; and a beautiful grassy plain, with lateral open forests, all within my own boundaries, occupied the interval. After the affair with the blacks had occurred, and also bearing in mind Mr Commissioner Mitchell's injunctions about changing the site of the hut and yards, I considered it judicious to remove at once to Boobara, and there to establish the homestead. To do so was attended with much danger, but equal or greater danger attended upon our remaining at Carbucky. I had three men with me, so we yoked the working oxen to the dray, put all moveables upon it, and abandoned the hut which we had hitherto occupied. Arrived at Boobara, we selected, as the most secure site for the homestead, a place perfectly clear of timber on the water side, within sight of some good building timber. The first thing we did was to set to work to build a hut for our safety, dreading all the while that the blacks might appear before our being well prepared for them. None, however, molested us, and once only were we seriously alarmed by hearing the well-known "Coo-ay" of a black fellow just about sunset. We got all the fire-arms ready, but neither seeing nor hearing any more of them, we concluded that it was a solitary messenger who had been attracted by the smoke of some large fires we had had burning during the day, and that this solitary individual had been despatched by his tribe, according to their custom, to ascertain who were the parties that had made it. The aboriginal tribes, it should be stated, telegraph to each other at great distances over the plains by means of columns of smoke, and ours had probably been mistaken for an unintelligible telegraph, to find out the meaning of which, we supposed, a courier had been sent off from some distant aboriginal encampment.

Just as we had finished our very rude hut, or rather our wooden castle, Mr N—— and the stockman White returned, with their collected cattle and two valuable bulls from Mr N——'s herd, which I had arranged before his leaving to have introduced into my herd. After talking over with Mr N—— the position in which I now stood with respect to the blacks, and estimating the expenses which would have to be incurred in erecting new yards and substantial buildings, and taking into consideration that Gundawinda, where I had recently been in temporary occupation, was an abandoned run with very substantial stock yards and paddocks remaining, and within three miles of the homestead of Boogabila, I concluded to remove to Gundawinda with my cattle, and to occupy that run in lieu of Carbucky. The run of Gundawinda was much inferior of the two, but then Carbucky far exceeded my immediate wants in its immense extent.

The blacks of McIntyre were always an interesting study to me. Many of them I am not ashamed to speak of as being my intimate friends. Some of the warriors were fine noble fellows individually, and by no means so very inferior in intellect as they are often represented to be. There were in these people, as in all savages, noble traits of character often to be met with, and I, as the only resident proprietor in the neighbourhood (a distinction which they perfectly well understood), was always treated by them with the most marked respect. The depredations committed were, I am persuaded, mostly commenced by a few incorrigibles, while the better disposed individuals of the tribe were unable to control the less tractable ones. It is quite a popular error to imagine, as is often done, that these people are under the absolute control of chiefs or kings, who can manage the whole tribe according to their will. They have no hereditary chiefs or kings, the personal prowess of a warlike individual alone giving him an uncertain temporary influence and authority.

Soon after removal to Gundawinda I drafted from the herd about seventy head of fat cattle for market. One of the greatest evils of being surrounded with troublesome aboriginals is the difficulty of getting cattle to grow fat when harassed by them. This evil is far more important than the loss of the few which they succeed in slaughtering for their own use. The implements they employ, chiefly common wooden spears, to kill cattle are so inefficient, and the cattle have such an instinctive dread of aboriginals, that they terrify or wound a disproportionately great number of animals for every one which they succeed in killing. The seventy selected cattle were chiefly four year old bullocks, and these I drove down to Maitland, on the Hunter River, with the assistance of a mounted stockman. The rate of travelling, with fat cattle in charge, is very slow, and the distance being nearly four hundred miles, the journey occupied about a month. Upon this, and upon a future occasion of a similar kind, I leisurely travelled over the auriferous district of the Peel River, following the river up towards its source and crossing the main range at Croney gap. Close to the road on the Peel River there is one very remarkable quartz vein, which on this occasion especially attracted my attention. I got off my horse and spent some time to examine it, and of that circumstance, when I afterwards beheld the auriferous districts of California, I had a most distinct and lively recollection.

I disposed of my beeves in Maitland for only thirty-five shillings per head, their average weight being about seven hundred pounds each. As the northern squatters at least once a year usually do, I proceeded by steamboat to Sydney to enjoy the pleasures of the city after a whole year's sojourn in the solitary bush, but having left two horses and a hired stockman at charges in Maitland, my holidays in Sydney were necessarily limited. I bought in Maitland an additional horse, and soon started again for the McIntyre. Having thus a spare horse and servant with me, I preferred in travelling to follow the practice of the country, and encamp in the open air every night in lieu of stopping at the roadside inns. We therefore did not follow the main road of travel, but returned to the McIntyre by nearly the same road which we had come down, namely, over the auriferous district of the Peel River, where grass and water, those essentials for travellers, existed in great abundance.

On reaching Gundawinda again I remained there some time, being still incessantly harassed and annoyed by the blacks. At least once every week for some time it was necessary to join an armed party of horsemen, either to protect my neighbour's cattle or my own. Yet on these occasions we seldom encountered the aboriginals. They were too nimble for us. The pursuit was like waging war against shadows. We often disturbed their camps and terrified them a good deal, but rarely met them in open fight. They, in fact, when mischievously inclined, occupied or sought safety in the thick scrubs, and our horses could only be effectually employed against them on the plains or in the open forests. We supposed, however, that our armed demonstrations always had a good effect upon their behaviour, for the blacks no doubt saw and watched our movements frequently when we failed to discover their retreats. These people have no settled homes, but lead a wandering gipsy life, sleeping only under the canopy of heaven, and continually removing from place to place, as their caprices or requirements may lead them. Hence the impossibility of subjugating them, either by force or by persuasion. Upon the whole they are an inoffensive race, and the mischief they commit is often perpetrated only with the wantonness of unruly schoolboys when robbing an orchard. The actual want of food is never a cause of their killing cattle, but they sometimes fancy beef in preference to kangaroo. The border police visited us occasionally; generally the patrolling force consisted of two men only, mounted and equipped, but these were not of much use except to increase the numerical strength and take the responsibility whenever the neighbouring stockmen united in an armed party to pursue the incorrigible black fellows. The Government regulations concerning the treatment of aboriginals were by no means adapted for protecting the lives and property of either the whites or the blacks on the frontiers. In theory the blacks were her Majesty's subjects, and entitled to her equal protection; in practice they were foreign enemies, continually levying war against the whites on the frontiers, and over whom individually her Majesty's officers had no control whatever. Their offences were committed by tribes, and individual distinctions could not be made. By law it was just as much wilful murder to shoot a black fellow as to kill a fellow Christian in time of peace; but in practice the border stockmen were quite habituated to meeting them in warfare whenever the tribes commenced cattle killing, and the Crown Commissioners of the district, who were armed with magisterial authority, and were more especially the protectors of aboriginals, found it necessary to shut their eyes to the well-known facts. But if the magisterial authorities either could not or would not protect the blacks, they were still more powerless in protecting the border whites from their murderous attacks; for example, here were at Carbucky the graves of five white men, all of whom had been murdered by the aboriginals at various times, not one of whom had ever been punished or arrested by authority for the crime. The consequence was that every stockman on the river believed himself to be doing a meritorious action in revenging the death of his murdered comrades, whose untimely end had been so totally disregarded or helplessly witnessed by those authorities upon whom Englishmen are most accustomed to rely for protection. The appointment to the magistracy of the stock proprietors resident on the borders, who were for the most part educated men, and their investment with large discretional powers, we (that is the resident proprietors) used to think offered the best remedy against the butcheries of black fellows by ignorant and lawless stockmen. This plan was in the end adopted about the time of my leaving the McIntyre, but for some time before this event I had discontinued joining the armed stockmen when following the blacks, because I found that these men, who were for the most part Crown prisoners upon tickets of leave, or expirees, very much objected to my witnessing their possible proceedings on these occasions.

I began to grow extremely weary of this incessant border warfare, and at length matters were brought to a crisis, and finally my determination was fixed to sell out my stock and leave the district by the following circumstances. A stockman from a station a few miles up the river came one day to solicit our assistance against the aboriginals, who had been destroying his cattle at a great rate; he proposed that we should make a strong party, and drive them away from the neighbourhood. The blacks were now upon his run, but shortly, he said, they would take all the herds in turn, and it was better to prevent them in time. It was agreed upon that we should do so, and a day was appointed to meet at his station, called Boonal; we were then to take several days if necessary, and persevere in seeking the blacks until we found them, or caused them to discontinue cattle-killing. Two mounted and armed stockmen, with myself, proceeded from my station, and met the others at the appointed place, but after riding all the first day along with the party, in all eight mounted men, we failed to discover any blacks that day. We had brought provisions with us, and at night all encamped on a little grassy plain beside a lovely lagoon known as "The Morella Water." On the second day we took a circuit which brought us upon the borders of my own run, and here, late in the afternoon, on a remote water in the scrubs, we suddenly came upon a camp of blacks. But to our astonishment we found them to be all women. This boded ominously, for the warriors, it seemed to us, by thus leaving their women in concealment, had probably gone upon some mischievous expedition, and our surmises proved unfortunately but too well founded.

We took two females prisoners, with the intention of making them track for us on the following day, and then proceeded to Gundawinda for the night. On approaching the station we soon found out the errand upon which the rascally blacks had been absent from their families. They had been upon an hostile expedition to my paddock, and had speared all the horses in it. There was at the time, in the hut, the hutkeeper and a stockman sick in bed from the effects of a fall from his horse. The natives, in war paint, had been seen to march in a body into the inclosure and deliberately destroy the horses. The hutkeeper had stood at the door with a musket in his hand, but had not dared to advance to prevent them. The odds in numbers will appear to those who are unacquainted with the habits of the blacks to be overwhelmingly against a single white man, but I am persuaded that, had either of the stockmen or myself been at home, the horses would have been saved. One man might, by the exercise of that ordinary courage which is so essential in dealing with savages, have been able to bring in the horses, whilst the sick man could have guarded the hut; as it was, the poor creatures were all laid dead. The loss of horses is a serious deprivation on a cattle station, for without them stockmen can neither gather dispersed cattle together again nor prevent further depredations. The next day, on our jaded horses, we traced the blacks with the aid of the two female prisoners. We found their camp about sunset, but the blacks, on seeing us, all took flight across the river, and afterwards went away from the neighbourhood entirely, as they usually did after a storm of this sort until the affair had blown over and been forgotten, or if ever alluded to on their next friendly visit the matter would be spoken of as the deed of some wild tribe quite unconnected with themselves.

When I had last come from Sydney, foreseeing something of the probable expense to which I might be put in consequence of the hostility of the native blacks, I had requested my agent, who was thoroughly conversant with my circumstances, to place at my disposal a small loan of money in case of the worst. I had paid in full for my cattle and station, there was no debt upon them, they were therefore available as security for any moderate advance; but I had already expended nearly all my cash resources, although I had gained considerably in the number of cattle; it was then with no small astonishment that I received from him a reply to the effect that "cattle were not a sort of security approved of in Sydney," and therefore the desired accommodation could not be afforded. I felt amazed at this cool and indifferent answer. I had expended in the purchase of a branded herd of cattle and station nearly a thousand pounds, and this sum represented property which two years before had been quite marketable for ten times that amount, and yet now I was told that there could not be placed at my disposal in case of the worst a loan of the smallest sum of money, while I knew large mortgages existed upon the herds of most of my neighbours. I thought surely there must be some great delusion on my part in considering cattle as property at all, or else that my agent must be an incompetent man of business; therefore, after the late outrages committed by the blacks, I resolved to sell the whole lot. I wrote to Sydney to that effect, stating particulars, and requesting that the property might be put up to auction on a certain day which I named, by Mr Mort, the broker who chiefly negotiated stock and stations in the colony. I also stated to my agent that I should return to Sydney to be present at the auction sale, and should bring a small drove of fat cattle with me. Both these intentions were duly performed, and again I travelled over the auriferous district of the Peel River in my journey down. On reaching Sydney I found that my otherwise instructed agent had, with the best intentions, advertised my property for private sale on application to himself, and already entertained some offers, but nothing definite came of them. After some delay consequent on this proceeding, the sale was finally put into the hands of Mr Mort. Through his agency the whole of the cattle branded D N, with station, were sold to Mr Henry Denis, a Moreton Bay squatter, for fifteen shillings per head. This was just the price which I had given for them, but then I had during the first year branded over five hundred calves, and the two drafts of fat cattle which I had sold during the time had about paid all working expenses. The cattle were branded D W at the time of my purchase, but being part of a divided herd, it was thought prudent to brand them over again with the letters D N, lest any old cows should find their way back to the station on the Gwydir or Big River, a hundred and fifty miles distant, where they had been bred, and where other cattle branded D W were yet running, in which case if any of mine should ever stray thither they would, unless differently branded, be irreclaimable

My thorough-bred imported English bull "Jasper" was also yet grazing on the Big River station, called Coogangoorah, for I had consented at the time of purchase to consider him as delivered to me at this place, and ever afterwards I had felt afraid to remove so valuable and quiet an animal amongst the black fellows of the McIntyre River. Coogangoorah Creek, with Bingera, which is very near to it, became one of the earliest proclaimed gold fields, but at the time of which I am now writing I had been once only over it; afterwards, however, when making delivery of "Jasper" to Mr Denis, I had occasion to ride over that district more than once again, so that, when subsequently I saw the gold mines of California, this vicinity was amongst others of those in New South Wales which I described to Mr Hargraves as being probably a gold-bearing district. The bed rock apparent along the river being the vertical slates so familiar to gold miners, besides a good deal of quartz and red earth being visible on some of the hillocks.

When the day of sale of my cattle and station arrived, they were offered with several other properties of a similar kind; one herd in a favourite district sold at twenty-five shillings per head, but for mine I do not think that there was a *bonâ fide* offer in the sale room. They were sold to Mr Denis by private bargain a few days subsequently.

The conditions of sale were that the vendor and the purchaser, or their agents, should both be upon the cattle run within twenty-one days from the day of sale, when the muster should commence, that the purchaser should receive the delivery of the herd in not more than two lots, and that the total muster should be completed within thirty days from the day of our arrival. This arrangement being all settled, Mr Denis wished to go first to his stations on the Darling Downs; he therefore took a passage by steamer to Moreton Bay, intending after visiting the Downs to ride over to me on the McIntyre at the stipulated time. I proceeded to the McIntyre by the usual route—namely, first by steamer to Maitland, and thence on horseback the rest of the journey, and again over the auriferous districts of the Peel River and Bingera. A Mr John Larnach, whom I knew by repute, intending to find new pasturage on the frontiers for a herd of cattle, came to me at one of the inns on the road to ask, as a matter of courtesy, if Carbucky station was at liberty from me. I freely owned that it was, and, indeed, recommended it strongly to him as being a very fine run. An excellent stockyard, which had cost upwards of a hundred pounds, I told him was yet standing; but the buildings after our evacuation of them had been burnt by the blacks. I thus gave to Mr Larnach without bonus a most valuable run, which some time afterwards sold without stock, as I was informed, for upwards of a thousand pounds.

Mr Larnach's cattle were already travelling upwards towards an uncertain destination—under the charge of a superintendent and several stockmen; and when Mr Larnach seemed disposed to occupy Carbucky, I asked permission to send "Jasper" into his herd for convenience of travel to the McIntyre River. This arrangement led me to Coogangoorah, where I contrived to be at the time the travelling herd was passing, and in riding over the run with the stockman at Coogangoorah in search of Jasper, I had a good opportunity of seeing what I afterwards learnt better to recognise as auriferous indications.

My first care was to collect as many of the more distant cattle as I could and deliver them, with such as were already on their own run, in the first lot to Mr Denis, and then to muster the second lot from neighbouring runs. I had got together about a hundred of the most distant and rambling cattle, besides about eight hundred on the run, on the day appointed for the purchaser to be at the station. Neither Mr Denis, however, nor his agent appeared. I waited for him a week, then losing patience, and considering my horseflesh inadequate to do justice to myself in making a second muster, I gave the order for the cattle to be turned out again, and determined to refuse to muster them a second time. Mr Denis's agent, with a stockman, arrived a few days afterwards, and excused the absence of his principal on the ground of illness. I refused to deliver any cattle to him, but I consented to supply provisions and accommodation until Mr Denis could be communicated with.

Mr Denis at length arrived. He brought some important news of a public kind—namely, that the great traveller Dr Leichardt, who had been given up for lost, after a long absence and when the dirge of "Leichardt's Grave" was being nightly sung in the drawing-rooms of Sydney, had unexpectedly made his appearance again, having succeeded under extraordinary difficulties in reaching Port Essington. I can never forget the agitated and broken accents in which the information was conveyed. "Leichardt reached Port Essington—lost all his horses — discovered magnificent grazing country—the Nonda plains—the Peak Range—many large rivers where he lost his horses in trying to swim them—found a herd of buffaloes—arrived at the port on foot with only one pack bullock, &c." It is lamentable to add that on a subsequent expedition, now many years ago, Dr Leichardt left New South Wales with the intention of exploring the interior to Western Australia, and has never since been heard of. The last expedition organised to search for the lost traveller was conducted by Dr Gregory in 1858. I attended in Sydney the public meeting on the subject held previously to the departure of Dr Gregory's party — an expedition which did not, however, prove successful in its results.

Mr Denis's tardy arrival caused great discussion respecting the delivery of the cattle, but finally we arranged a compromise between ourselves. I showed my branding book, made a liberal allowance for casualties, and referred to the general reputation of the herd amongst neighbouring stockmen. I then proposed to consider the herd as consisting of a certain number, and to deliver them to the purchaser without a muster—the original written agreement of Mr Mort's to be binding in all other respects. The number of this herd was eventually agreed upon between us, but we also made a supplementary agreement which afterwards led to some difficulty. Mr Mort had only sold the cattle branded D N, with station. I had reserved to myself all cattle branded D W, which I had not been able to rebrand, and also ten working oxen, a dray, and three supernumerary stock horses ; I had not included these in the original sale, because I could not muster the D W cattle within any reasonable time. I had seen in one of my excursions a sweet little grazing station called "Coppèmorenbila," on a lagoon within twenty miles distance from Gundawinda, with hut and yards all erected and quite vacated. The District Commissioner had told me I could occupy this run if I chose. I thought of going there, and after giving my horses a good rest, of then mustering the D W cattle to place upon it, and perhaps to purchase other poor cattle, and so make up a little herd and station for sale in one lot. But Coppèmorenbila had in the meantime been occupied by some other party, and I now required that Mr Denis should take also the D W cattle, the working oxen, and the additional stock horses, upon terms similar to those of the first agreement. The team of working oxen I had rented out to a carrier of good repute, in consideration of his bringing me one load of rations per annum from Maitland to the McIntyre, and also paying me five pounds in money. I had done so because the quiet working animals, which were of greater value than the ordinary bullocks of the herd, would have fallen the first victims to the hostile blacks. The team had been at the station when I expected Mr Denis's arrival, but I had given the man leave to go away a few days before his agent reached the station, so that I could not now deliver them to Mr Denis. It was then agreed that Mr Denis should give me a draft upon his Sydney agent, payable twelve months after date, for the property included in the supplementary agreement, and I engaged verbally not to present the bill for endorsement until advised by Mr Denis of the team having been duly delivered to him. I mention these circumstances more particularly because they led me afterwards to travel over a great extent of beautiful grazing country, which otherwise I should probably never have seen, and it was extensive travel that enabled me to compare in a general way the auriferous aspect of Australia with that which I afterwards witnessed in California.

I now left the McIntyre River, and I left it with regret, after all my difficulties of management. The beauty of its magnificent plains, covered with luxuriant grasses ; the pendulous myall trees, gracefully grouped over open savannahs; the forests of various kinds of eucalypti, which give so parklike an effect to the woodlands; the impenetrable scrubs of brigalow bushes, and the genial climate of perpetual spring, altogether have stamped impressions on the memory which time will never entirely efface; while the exhilarating delight of galloping over boundless plains of grass, mounted upon a good horse, in the management of one's own cattle, is a gratification that, once experienced, can never be forgotten. Then my sable friends, who had latterly been on their good behaviour—the redoubtable warriors Coppè, Tommo, Peter, Old-man-Jackey, Nelson, Friday, and Bomerang-legged-Bobby—all fine fellows in their own way, were parted with on the best terms at last, and each expressed his sorrow at my departure. With the stockmen on the river I had always maintained a good understanding, and on leaving I felt that I had really enjoyed the rough life of the frontiers, notwithstanding the extreme harass to which I had been so constantly subjected.

I resided awhile in Sydney during the year 1846. It was my intention to purchase sheep with station for the next adventure. I preferred wool-growing to cattle-farming, and I had seen enough to satisfy myself that it was a far more profitable occupation. I travelled northwards to look at some flocks with a run for sale on Oaky Creek, near Gammon Plains, beyond the township of Cassilis. I found the run which I went to examine limited in extent, entirely without surface water, and with only one permanent well upon it, besides another shaft seventy feet deep, where the well-sinkers had failed to reach the indispensable element. However, these sheep sold on the day of sale for eight shillings per head, and that price was beyond my valuation of them. Sheep had been steadily increasing in money value for some time past, and I now began to doubt whether any would shortly be obtainable within my limits; it was besides annoying to expend on these occasions twenty or thirty pounds in travelling expenses, to view property which one did not buy after all. A chance at length offered from an unexpected quarter. My agent, Captain D——, was a principal creditor in the insolvent estate of a stockholder and landed proprietor near Queenbeyan, in the settled districts to the southward of Sydney, and on the borders of the great squatting district of Maneroo. The insolvent, Mr K——, was an old colonist, and had for some years been in pecuniary difficulties. His creditors, after a long indulgence, had now determined to dispose of his properties. Captain D—— had the nomination of a superintendent to take the estate under care until it should be realised, and he at once considerately offered it to me, partly with the object that I might purchase the whole or such part of the stock as might suit me. Upon the insolvent's freehold at Queenbeyan a flock of twelve hundred ewes, with four hundred sucking lambs, about thirty horses, and a hundred head of horned cattle, were depasturing. At a station called Frog-hollow, in Maneroo, about fifty miles from Mr K——'s homestead, there were two flocks of his sheep grazing with a person upon terms, and at the next adjoining station, called "Goodgood," there was a small lot of Mr K——'s cattle running upon halves with a Mr C——. I took all these in charge, and lived upon the establishment at Limestone Plains, about seven miles from Queenbeyan, for some months. The estate of Yarralumla, belonging to Terence Aubrey Murray, Esq., is the next adjoining landed property, and at this place the Rev. Mr Clarke obtained specimens of trilobites and other distinct silurian fossils during the subsequent geological survey which he undertook at the instance of Government shortly after the first gold washings had commenced. Goodgood is in the same geological series, but with auriferous indications more strongly marked than any which I saw in its neighbourhood. Mr C—— wished to dispose of "Goodgood," and I made a conditional agreement with him for it, namely, that if I purchased any of Mr K——'s sheep on my own account that I would then pay him for it, and remove the flocks thither, or otherwise not take it at all. The horses and cattle were sold at Queenbeyan in small suitable lots, none of which I purchased. The sheep running at Frog-hollow, which were reputed to be diseased of the scab, I caused to be offered for sale at the same time, but with one reserve bid on behalf of the assignees. There was no better offer than fifteenpence per head for these sheep. The better sheep running at Limestone Plains I directed to be sold at Goulburn (the chief town in the southern districts, and distant about fifty miles from Limestone Plains). I wrote to the assignees to inform them of the very low offer for the sheep at Frog-hollow, and advised their being offered with the others at Goulburn. Very much to my astonishment, after the sound discretion I had used, the official assignee wrote to me to express regret that I had not sold them at fifteen-pence each! and requesting me to do so if the party who had offered would still take them at that price. I wrote back most indignantly, and stated that I would myself be responsible that they should sell for more than that value in Goulburn. I might under these circumstances have sold them to myself at fifteen-pence each, but I could not in common honesty permit them to be sold for so small a price, notwithstanding the lamentable want of judgment in the assignees. The flocks in question sold on the day of sale in Goulburn at two shillings and one penny per head to an agent of the present Sir Charles Nicholson, and thus proved my proceedings to have been for the best. They were even at that price an exceedingly cheap bargain, for there were included fifty superior half-bred merino rams counted in at the same rate with the rest; these alone were worth the whole purchase money, and the scab, as it proved, had been completely eradicated from the flocks before they were sold.

The superior flock of twelve hundred fine woolled half-bred merino ewes, with eight months' wool on their backs, and with four hundred lambs given in, fetched three shillings and sixpence per head. These sheep had also been reported to be diseased with the scab, but I believed them to be perfectly sound; therefore I had caused them to be examined by magisterial authority, and I directed to be exhibited on the day of sale a magistrate's certificate that the flocks had been duly inspected, and no indications whatever of the scab had been discovered. This certificate was essential in order to prevent their being unduly depreciated, and also to facilitate their removal across neighbouring runs after their disposal—diseased sheep being prohibited by law from travelling in all cases whatever.

Of this flock I became the purchaser on my own account, and at once removed them to Goodgood. Shortly afterwards I completed to the satisfaction of all concerned the business of the insolvent estate at Limestone Plains, and then I took up my residence at my own station of Goodgood, which I had purchased of Mr C——.

The station of Goodgood is so exceedingly interesting in a geological sense, and its geology exercised so much influence in awaking my special attention to the auriferous character of the interior of New South Wales, that I may here pause to make a few remarks upon it. It is situate on the western slope, very nearly on the axial line of the main range of the Cordillera, which divides the eastern and western water-sheds of the colony. Its general area chiefly exhibits metamorphic slates, through which are protruding bosses of granite as well as of basalt, and contiguous to these are strata of perfect mica schist. One band of limestone crosses the run, but no fossils that I am aware of have been found within it. There are several distinct reefs or veins of quartz, and one band of quartzite more especially examined by the Rev. Mr Clarke, after he had obtained some specks of gold in the stream near it in 1851, is considered by him to be the equivalent of the "Stiper stones" of Murchison's Silurian System. Within the same limits there is perhaps no portion of the colony more geologically interesting or more pregnant with all the ordinary auriferous indications.

About the time of my going to Goodgood I received information of the loss of the "Sovereign" steamer, near Moreton Bay, on her passage to Sydney, and amongst the passengers drowned on that melancholy occasion appeared the name of the purchaser of my cattle station, Mr Henry Denis, of Jimbour. I held sufficient security for the unpaid portion of the sale made by Mr Mort, but the bill which represented the supplementary sale made by myself had not been indorsed by any other name, nor presented for indorsement in consequence of my not having received the stipulated notification from Mr Denis of his having received the working oxen according to the terms already explained. A difficult legal question arose now, namely, whether or no I had sold them to him, or rather, whether or no he had accepted the offer of sale. Shortly afterwards I went to Sydney and took professional advice on the matter, the result was that I had to undertake another journey to the McIntyre, and thence, finding that the team had been removed to Jimbour, I continued my journey to that station on the Condamine River, and travelled over the fairest portion of that paradise of graziers, "The Darling Downs." Upon this occasion I travelled on horseback at least one thousand miles in a continuous journey, and then took a passage at Moreton Bay in a small coasting craft to return to Sydney. I had again a famous opportunity for making myself acquainted with the resources and capabilities, geological, pastoral, and agricultural, of the interior of the colony.

I passed, however, over but little new auriferous ground on this journey, but my course led me again once more over the gold districts of the Peel and Bingera. With the grazing capabilities of the Darling Downs I was highly delighted, and I have never since in any of my travels seen more excellent pastoral country. The great plain of the Condamine presented an ocean of grass, bounded by the horizon on every side, with the exception of the faint outlines of mountains in the dim distance; the swelling downs contiguous to it, covered with the most nutritious grasses, were in their undulations on so large a scale that there could be hardly any limit to the size of the flock which one shepherd might tend upon them. The economy in management which runs of this kind admit of can only be fully appreciated by those who have experienced the difficulties of engaging shepherds for remote districts, where bushy runs will not admit of large numbers of sheep being tended in one flock, even in cases of extreme urgency. I found my team of oxen at Jimbour, but the person in charge of the station not being inclined to let me remove them without an order from the Public Curator of Intestate Estates, I sold them conditionally for one hundred pounds to a person in the employment of Mr H. S. Russell, a squatter on the Condamine. The purchaser being about to commence business as a public carrier, was content to consider the working oxen, which he knew, as delivered to him in the bush; and his employer engaged to pay me the stipulated sum on receipt of the Curator's order for delivery. This arrangement ended to the satisfaction of all parties. For the supplementary horses and cattle, which the late Mr Denis had appropriated, I afterwards obtained an allowance in money from the Curator on making the requisite affidavits. I encamped one night during this journey on the Condamine with a Mr Goggs, whom I had known previously, and who was now removing his flocks and herds from the settled districts to a new run on Dogwood Creek, in the Darling Downs district; and, accompanying Mr Goggs's expedition, I was agreeably surprised to meet with a gentleman whom I had slightly known in England,—a Mr Scholefield, from Yorkshire; this being the only occasion upon which I ever accidentally met with an English acquaintance in the colony.

Brisbane-town, where I embarked for Sydney, is the shipping port for the Moreton Bay district, and a place of rising importance. These northern districts are now erected into a new colony, which is called Queensland; and Brisbane-town will contend with Maryborough at Wide Bay, and Gladstone at Port Curtis, for the distinction of becoming the permanent seat of Government.

After a miserable voyage, in a small coasting craft, from Moreton Bay, I reached the capital of the colony once more, and thence proceeded immediately southward to my station of Goodgood.

I lived at Goodgood about two years, removing the flocks sometimes to Cowrah Creek, where I had built a hut for an out-station, while sometimes I sent a flock to the neighbouring run of Frog-hollow. I received during the time the benefit of two shearings of wool, and two crops of lambs. The nearest post-office was at Cooma, near the quarters of the resident Commissioner for the Maneroo district, the distance to which was about twenty miles by a bridle path along the bed of the Goodgood River, past its junction with Cowra Creek, and thence, after reaching the Maneroo plains, crossing the Umorella River. This road, which I usually travelled, led me frequently along the auriferous channel of the Goodgood River, which was here so rugged that the sheep hardly ever grazed upon this part of the run, and had not the path followed the river course I should not have been so familiar with this auriferous portion of it. Shortly after first settling at Goodgood, I went personally on a journey to Braidwood to purchase some rams from the flocks of Mr Andrew Badgerry, and the journey led me over the country which afterwards became so notorious as the Braidwood gold field. I had, before the gold discovery, been over this auriferous land but once however, and although it has since proved one of the most productive granite gold fields in Australia, I may now candidly observe, after having witnessed many other gold fields, that the auriferous indications at Braidwood were not eminently striking before the earth had been turned over in search of the precious metal. At the time of which I speak there was a population settled upon it, not one of whom had ever, by any accident, seen a speck of the precious metal; and yet, just beneath the grass, the whole district was covered with that sort of small gold which is characteristic of a granite bed-rock.

Another episode during my stay at Goodgood was the purchase of the Nimitybelle run (to which I understand the alpacas lately introduced into the colony have been removed) on Maneroo Downs, with a herd of cattle, said to be about eleven hundred in number, and which were to be delivered without a muster by the assignees of an insolvent estate. Being tolerably well informed of the particulars, I purchased in Sydney the whole in one lot, and paid for them; but after going to examine my purchase, I found that the run, although first class in character and capabilities, was encroached upon by four or five trespassers, who were prepared to litigate to the last extremity; and the cattle, as I already knew, existed for the most part only on paper, the few which were really in existence being so wild as to be hardly worth the collection. Under all the circumstances I considered that I would repudiate the purchase on the ground of misrepresentation, and I succeeded in causing the assignees to return the purchase-money in full.

During all the time of my being at Goodgood the very crystallinic character of the mica schist continued to attract the attention, not only of myself, but also of the shepherds, who were continually bringing specimens to me to ask if it were not gold, or an indication of it, and amongst others whom I had lately engaged as a shepherd was one by name Thomas Appleby. This man had seen better days, and had a great deal of experience in the colony. He was besides gifted with strong natural good sense, and intemperate habits alone had reduced him to the necessity of servitude in this humble capacity. Appleby was always disposed to look for gold at Goodgood, and I think it likely he may have lived in the Western Districts about the Wellington Valley, since he was so early acquainted with the fact of a shepherd in that neighbourhood having found gold during a number of past years, and of having effectually concealed the fact from the authorities, but he described very correctly the manner in which the fortunate shepherd got his gold by breaking up "*white flints*, just such as these, Sir," as Appleby one day said while picking up at the same time the quartz pebbles which were scattered about in tolerable abundance on the Goodgood run in addition to the compact quartz veins to which I have already alluded. Appleby was not the first man who mentioned to me the secret of the gold-finding shepherd, for the fact of a shepherd habitually finding gold was known, I venture to say, to every other shepherd in the colony of two years' standing. The tradition had passed from shepherd to shepherd, and whilst the Government and the men of science, as it afterwards appeared, either were or affected to be ignorant of the circumstances, the facts were universally spoken of at this time in the pastoral districts, though they might be but little heard of amongst the Sydney citizens. But Appleby described the manner in which the lucky shepherd obtained his gold more circumstantially and more correctly than any other person I met with, and I think that he must either have collected his information from the immediate neighbourhood of Wellington, or it may have been from an actual personal acquaintance with the gold collecting shepherd himself.

When the second shearing was over I prepared to go again to Sydney to ship wool for England, but just before starting the first news of the wonderful gold diggings in California reached Maneroo. Everybody was talking about them there in March, 1849. The newspapers were full of marvellous accounts of their wonderful productiveness, and they also teemed with paragraphs describing how gold existed in quartz veins as well as in common diggings. These descriptions led me again to go carefully over the quartz veins at Goodgood, but not a speck of gold was there to be found in them. In every respect did Goodgood answer the description of a gold field. But the simple art of washing the soil for gold is one which no written description can convey, yet which any digger may teach by example to a novice in five minutes. Of this art I was now quite ignorant. Every newspaper description, however, asserted that the alluvial gold in California had been abraded from its matrix in quartz veins, and therefore to search the quartz veins at Goodgood, where the gold grains, if any there were in them, must be readily visible, was an easier task than washing the soil, and would no doubt have been successful if the theory had been true that the alluvial or placer deposit gold had been derived from the abrasion of quartz veins—but this very mistaken doctrine, as I shall explain in this volume, is in my opinion quite untenable.

As I approached Sydney, California was everywhere the engrossing topic of conversation. There were "California" coaches, "California" public-houses, and "California" drapers' shops, to arrest the eye in every thoroughfare. Five or six ships in harbour were laid on for California. Every unemployed man possessing the requisite passage-money was preparing to go to the land of gold. The California fever raged amongst all classes. After shipping my wool, and learning all the information which was to be obtained on the subject, I too caught the contagion, and resolved to go and see the new El Dorado. To remain to sell my sheep would occupy too much time, therefore I spoke to Mr Mort about transferring a half-interest to a partner; but on consideration we thought that this plan would not lead to any satisfactory result, so finally I concluded to leave them for some months under management whilst I undertook the voyage to San Francisco. I returned to Goodgood to make final arrangements. I prevailed upon my neighbour, Mr John Pethick, of Jingera, to superintend the establishment during my absence, and gave a power of attorney to Capt. D——, in Sydney. I left Appleby and his wife in charge of stores at the station, and reduced the flocks by sending six hundred sheep to the boiling down establishment in Goulburn.

My pecuniary means had never been fully employed at Goodgood, so I now had sufficient money to make a small mercantile adventure without disposing of any other of my live stock. The most extravagant prices for provisions and clothing were said to rule in California, and the value of goods had risen considerably in Sydney in consequence. I invested about three hundred pounds in merchandise for the Californian market, chiefly in ready-made clothing, and then took a passage in the barque "Elizabeth Archer," commanded by Capt. Cobb. We sailed in June, 1849. The side cabins were each fitted with two berths, and my companion in the same cabin was Mr Edward Hammond Hargraves, of Brisbane Water. We had already been introduced to each other through the medium of a mutual friend, but until now we had not personally met. For three days the vessel had to remain in Sydney harbour weatherbound, and it is a very remarkable circumstance that there appeared during this time in a Sydney journal an article headed in large letters "Port Phillip a Gold Field," with a circumstantial account of some youth having found a lump of gold between Melbourne and the Pyrenees. The statement was a good deal doubted at the time, but now one may reasonably conclude that the account was perfectly true.

Thus in the manner I have related did I acquire by extensive travel, during the period of five years, an extensive acquaintance with the interior of the colony of New South Wales, upon the western slope of the main range of mountains, or Cordillera. I had not merely travelled over the land, like a tourist upon an excursion of pleasure, but had mixed with the scenes and affairs of busy life, and the course of events had brought me into contact with all sorts of people in the most remote districts. The traditions of the past, when the colony was a penal settlement, had been related to me at leisure in all their revolting details, and indeed most of my hired servants were either ticket-of-leave men or expirees. With more genial companions the bright prospects of the future for Australia had, when opportunity offered, been discussed at the nightly bivouac over blazing log fires, or by the hearth of our lonely huts. The extent of runs, the breeds of cattle, the quality of wool, the excellent points of horses, stirring tales of marvellous escapes from savages, and such-like topics of bush life, afforded endless subjects of conversation; and at other times the geological and mineral resources of the colony would be matter of inquiry. The copper mines of Burra-burra in South Australia had already become notorious for the extraordinary profits they yielded. In New South Wales several copper mines had been opened about Bathurst; the Fitz-Roy iron mine near Berrima, over which I had travelled, had been brought by a company before the public; and in my ramblings I had noted other mines entirely unexplored, quite equal, I imagine, to any of them. These were situate in the mountainous country around Goodgood.

The voyage to San Francisco was most agreeably diversified by the vessel calling at Pitcairn's Island to obtain vegetables. The romantic history of its interesting people, the descendants of the mutineers of the "Bounty," a ship sent by the British Government, towards the close of the last century, to convey a superior variety of sugar cane and other valuable plants from Otaheite to the West Indies. The "Bounty" had been wrested from her commander at sea, and sunk at this island to avoid discovery. The mutineers had previously carried off a number of native wives and some young men from Otaheite to settle with them in this remote spot. Their descendants now amounted to one hundred and fifty-two persons, of all ages and both sexes. The history of the mutineers is too well known to need repeating here; it is enough to say that they quarrelled amongst themselves and slaughtered each other until only one seaman, "John Adams," was left to become the sole patriarch of the family. The inhabitants, their descendants, were all very religiously disposed at the time of our visit. I remained three days on this lovely little isle, which in size is but about three miles long by two in breadth, yet of an exceeding fertile soil and covered with tropical vegetation. My particular host was "Isaac Christian," a descendant of the third generation from the celebrated leader of the mutineers, "Fletcher Christian." The whole community has since been removed to Norfolk Island—a large fertile island formerly a penal settlement, and situated about a thousand miles from Sydney. This island affords a more commodious home for them than the islet they have abandoned, and they will undoubtedly be happier there unless the *mal du pays* prove insupportable to them. His Excellency Sir William Denison, Governor-General of Australia, visited them in 1856, took them formally under British protection, and officially assented to a political constitution for their future government.

The only other incident of the voyage was experienced in visiting at sea an American barque from the state of Massachusetts, commanded by Captain Atsatt, and owned by the passengers on board, who had formed themselves into a gold-mining co-partnership, and purchased the vessel to proceed to California.

Our vessel gallantly entered the glorious bay of San Francisco on a bright morning in September, and revealed to our sight a large fleet of merchant ships moored in front of the city. The excitement of all on board knew no bounds. We hailed every boat that passed for information, and the universal response of plenty of gold was music to our ears. We soon learnt that nearly all the stately vessels in sight had been abandoned by their crews, and many even by their officers and commanders. The temptations to desertion were greater than any ordinary virtue could withstand, for the earnings of labourers at the gold diggings were said to be at a minimum equal to two pounds sterling daily to each man. The diggers who came to the city to purchase supplies or for other purposes brought accounts of inexhaustible wealth at the gold washings, and seamen engaged in Europe or America at low wages could not, when opportunity offered as it did here (for unlimited license prevailed), remain faithful to engagements which they had entered into under far different circumstances, and consequently they deserted their ships universally as soon as their vessels were anchored in the bay.

The crew of our vessel deserted the first day. Six of the intermediate passengers, with Mr Hargraves and Mr Surgeon Jeston (the doctor, in ordinary phraseology), had arranged to go to the gold diggings in a sort of temporary partnership. But since Captain Cobb had gained the good will of all his passengers, this intended company volunteered to discharge cargo for him before starting for the gold mines. I had to dispose of my merchandise, but I agreed to join the party conditionally, if I could possibly sell my goods to advantage before they started. Mr Hargraves was particularly desirous that I should do so, and I was all anxiety to see the gold-diggings myself. I wished especially to compare California with Australia, of which I had seen so much, and to observe in what respect they resembled each other. I had no intention at first of staying at the diggings longer than was essential for making these observations. I soon sold my merchandise, at a profit of fifty per cent. delivered in bulk over the ship's side, all except two puncheons of rum, which I shipped to return to Australia, and half a ton of biscuits, with two tierces of beef, which I had originally brought contingently for our consumption at the mines. These I now found were quite unsaleable in the city. The party about to proceed had no objection to my taking the biscuits and beef as a venture to the mining district on my own account, and so I accompanied this little association to the gold diggings; but, before starting, I remitted thirty ounces of gold dust to Sydney, to meet any unforeseen expenses in the management of my sheep, and the residue I deposited in a sealed box in one of the San Francisco banks.

We took a passage in a small schooner for the head of navigation on the San Joachim River, where the rising city of Stockton had lately been established. This city occupies a convenient place as an entrepot for the southern diggings. Upwards of a week was passed on board this miserable craft, crowded with diggers, on a voyage which steamers now perform regularly in six hours. The San Joachim is a fine large river flowing through a marshy country overgrown with gigantic rushes called "*Tules*," until nearing Stockton where the banks are elevated and fertile, with oaks trees and green sward on each side. At Stockton we found plenty of teams, both of mules and of oxen, ready for hire to convey miners with their outfits or merchandise to the various diggings. A bargain was soon concluded with a teamster, one Mr Reynolds, a "Hoosier," as he described himself, to transport our luggage and supplies to the gold-diggings on Wood's Creek, in consideration of a payment of sixteen cents (eightpence) per pound avoirdupois. Another teamster, one Mr Wolf, "a full-blooded Buckeye," as he boasted to be when asked from what State he came, being a particular friend of the driver and owner of the team which we had engaged, agreed to travel in company with him, so that whenever any extra strength might be required in crossing creeks, or after the waggons getting bogged, the two ox teams might, as is customary in such cases, yoke on to one waggon and so pull each other through the difficulty. The first day's travel lay through an open oak forest, over the nearly level valley of the River San Joachim, and we encamped the first night near a public house called "Dancing Bill's." It rained during the night, and we now first experienced the benefit of the tent, which had been made on our passage up the river. On the following morning the rain continued to pour down, the ground had become saturated, and the oxen dragged the waggon along with great difficulty about six miles further. Here we encamped again. The rain poured down incessantly all night, and when morning appeared it was declared impracticable to proceed. We were now in the midst of a rolling prairie entirely destitute of timber. This rolling prairie, or open downs as we should have termed it in Australia, is lightly covered with grass, and situate between the valley of the San Joachim and the wooded uplands of the gold-diggings which gradually rise towards the Sierra Nevada. In this difficulty the Buckeye and the Hoosier put their heads together, and the result was an agreement between themselves that the two teams should be yoked to one waggon to be dragged all the distance through to the diggings, and that the remaining waggon with all it contained should be left behind for a future undertaking. The waggon in Mr Wolf's charge was conveying a New York

Company with their supplies to the diggings, and to them the first preference was given, on the ground of their having a sick comrade. We expostulated and protested against this proceeding. We required to be drawn to the timber only five miles further, so that we might be placed near firewood before the double team continued its journey of uncertain duration in an attempt to reach the gold-diggings, for the task of its accomplishment now began to appear doubtful, since the periodical rains had set in so prematurely. Our entreaties were in vain. We were left without the power of moving, and the rain continuing unabated rendered it quite impossible for any of us to proceed separately on foot without an extra tent and supplies. We had now begun to acquire American habits, and therefore divided ourselves into committees. First a wood committee was appointed, then a foraging committee, and thirdly a cooking and home committee. I fortunately possessed an excellent double-barrelled fowling-piece, and consequently I got myself placed upon the foraging committee. We had previously elected our officers. Mr Hargraves was appointed president, I was chosen treasurer, Mr Lawrence Potts became secretary, and with the Doctor we made a special arrangement for medical services. We remained ten days in this miserable condition. On the second day a solitary tree was discovered, which supplied us scantily with fuel. In my foraging capacity, however, I enjoyed rare sport, and never perhaps had sportsman a better field. Game was abundant, and consisted chiefly of deer, antelopes, hares, rabbits, ground squirrels, geese, ducks, and the large Californian quails. Mr Potts and another young man was associated with me in shooting, and our schemes for surrounding the timid antelopes in the valleys or following the larger deer afforded us all those exhilarating delights which hunters only know. My tierces of beef I had left in Stockton as not being worthy of carriage, and I may here state that they remained there until unfit for use, and so were a total loss, but I had brought on the biscuits, and eventually they proved quite a lucky adventure. On the road we met some of our steerage passengers, who had been to the gold-diggings and were returning quite disheartened. They assured us that all the mining ground was already occupied. I have since met many so-called unfortunate gold-diggers of this helpless and desponding order. Since the rains had set in thousands of gold-diggers came tramping down to spend the winter in San Francisco. No adequate accommodation for them to sleep was to be had at the road-side tents during the rain, and but few places where food could be purchased. I had not intended to retail my biscuits, but to dispose of them all in one lot to some storekeeper at the diggings. But now, when these famished diggers, with plenty of gold in their pockets, came earnestly soliciting that I would sell them a little bread at any price I chose to name, neither humanity nor interest permitted me to refuse them. I usually gave them what they required to eat and told them to give me what gold they chose in return. I found the ragged and wretched poverty-stricken-looking Mexicans by far the most liberal men. One of these poor-looking fellows gave me in exchange for three biscuits a pinch of gold dust with one rather larger piece of gold included. I signified that it was too much for the bread, and that the single piece of gold would satisfy me, but he said no, I must take it all. I kept this in a separate paper, and afterwards found it to be of the value of ten shillings sterling! Numerous cases of great suffering came before our notice, and although our tent was crowded by ourselves, we were frequently obliged to admit travellers during the night to shelter from the inexorable weather.

The teamsters at length returned, and now demanded an additional sum of money to convey us to the diggings. We resisted this imposition. They then hauled the waggon with our supplies as far as the timber, when finding that we refused to pay them any money not agreed for in the first contract, they were now willing to forfeit all we had agreed to pay, and wanted to take away the empty waggon and leave us. But we would not allow the waggon to be taken, and so we prepared to resist them by force. This brought down a party of Americans to fight the Britishers, as was said, but on hearing the case, a feeling prevailed amongst them that justice was on our side, and we were not molested. I feel bound here to observe that the wish to do right is prevalent in the American character, and that, though proceedings of this kind may be called "Lynch law," justice is impartially administered in most cases. A negotiation was now proceeding between the two teamsters, one wishing to buy the team of the other, since the oxen had become so poor that only one effective team could be made up from them both. When they had conditionally concluded an agreement, they came to us in a more friendly spirit, and we finally consented to pay an additional sixty dollars, in order to proceed immediately to our destination. We were now taken under Mr Wolf's especial care, and reached the gold-diggings about a month after leaving San Francisco, thus completing a journey which in ordinary circumstances may be performed in one day on horseback.

Mr Wolf met with a squire (that is an American magistrate) whom he had known in Ohio. Mr Wolf considerately introduced us to him as a party of superior Englishmen, for we were now on excellent terms with the full-blooded Buckeye. The squire very courteously undertook to initiate us into the mystery of washing gold in a tin dish, and still further he most kindly showed us a good place where to commence digging operations; in short, guided by his instructions, we pitched our tent judiciously upon a little gold-bearing creek, midway between James Town and York Town, about five miles from the city of Sonora, in the very centre of the southern diggings. This attention on the part of the squire evinced genuine politeness, while he rendered us essential service by his information and instruction. I have since frequently experienced similar courteous treatment at the hands of Americans to whom I have been an entire stranger, and I here gratefully acknowledge those obligations.

Just as the oxen were about being unyoked at the place which we had fixed upon for a permanent encampment, a solitary wild deer came bounding past us. I seized my gun to pursue it, and while following the animal, of which I soon lost sight, suddenly came upon a number of gold-diggers busy at work. These men were the first I had seen engaged at their occupation. They were quite friendly and communicative—nothing was seemingly kept secret—their earnings and their prospects were alike told with apparent candour, and the vacant places on the creek were willingly pointed out to me; in fact, I took possession of a very good claim upon it shortly afterwards, from which our party took away a good deal of gold. Even whilst I was looking on at one man, who was scraping the slates with an iron spoon, I noticed, wedged in between the laminæ of the slates, a good-sized piece of gold, which he had overlooked, and which I pointed out to him. As an officer of our little association I mentally resolved that some of the party should come to work on this promising back creek, and we never had reason to regret the step after doing so.

Our company was now divided into two working parties, one of which employed itself under Mr Hargraves's immediate superintendence upon the back creek I have just mentioned, while the other was engaged upon the watercourse where our tent was pitched. We had to purchase cradles at the rate of twelve pounds sterling for each one of those rude machines, which in ordinary circumstances would not have been worth as many shillings. Tools of every other kind we had brought with us. Mr Potts and I were employed to prospect, that is, to make preliminary examinations and selections of mining ground with the view of its being subsequently worked by the whole force of our party. The duty of prospecting is a wearisome occupation, exceedingly trying to patience and perseverance. Some mental constitutions never can endure the task, and Mr Hargraves had an especial distaste for it, always preferring to remain with the party at work. In pursuance of our obligations Mr Potts and I rambled over the country in every direction within a radius of five miles, and were enabled not only to observe the various diggings ourselves but to collect a vast amount of information by conversing with miners wherever we found them at work, and who were generally quite willing to impart their experience to us.

The very first view of the neighbourhood of Wood's Creek struck me for its resemblance to "Goodgood," in Australia, which I had left so recently; while the outcrops of quartz called to memory the quartz vein which I had at a more distant time seen on the Peel River. Our conversation naturally turned upon the gold which had been found by the shepherd near Wellington, in New South Wales, and although my companions might have heard of the rumour, yet I was better informed of the details than any of the others. But where was Wellington? The Wellington valley, the Wellington district, and the township of Wellington I knew to be all situated somewhere to the westward of Bathurst. Remarks such as these brought to Mr Hargraves's memory the fact that he had seventeen years previously been, during a short time, in the country to the westward of Bathurst, and to the best of his recollection it was a district of slate and quartz resembling that in which we were now located. This information of course strengthened our belief in the shepherd's gold-findings near Wellington. But except this general expression of the presence of slate and quartz in the Western Districts, between Bathurst and Wellington, no particular creek or remembered spot was ever especially mentioned by Mr Hargraves; indeed too long a time had elapsed for him to remember particular places seen once only on a visit. The rumour of the gold-findings by the shepherd in that district was confirmed by Mr Hargraves's faint recollection that the aspect of the country indicated an auriferous region. But when I could state that the western slope of the main range of the colony to the north appeared like an auriferous country, and that again to the south the auriferous indications were equally strong, and when I possessed a knowledge of the country lying between the two extremes, both by Mr Hargraves's general description of it and by the circumstance of the shepherd obtaining his gold by breaking up the "white flint," there could not be a doubt upon my mind but that Australia on the western watershed contained an extensive gold-bearing area. But of its richness, as compared with California, I possessed but very slight data upon which to frame an opinion, especially as I had yet witnessed but one phase of gold-mining upon a limited gold-field in California. I had seen more of the area of the interior of Australia than all my companions together, and I may say, without inordinate vanity, although my attainments were of a humble kind, that in geology and science I was equally in advance of them; the Doctor, who had received an education in such branches of science as belonged to his profession, perhaps alone excepted. I became, therefore, a sort of reference in all our discussions upon the existence of gold in Australia, and I pointed out not one only but a great many places in the colony which I thought likely to be auriferous, besides detailing the particulars of the gold-findings near Wellington, and describing the character of my own sheep run at Goodgood.

Mr Potts discovered some gold of large character one day when prospecting at a place where the watercourse ran right through a huge dyke or vein of white quartz. Next day we went to examine the place together, and again we found coarse gold in the creek just where it flowed over the quartz, but on neither side, either up the stream or down the stream, could we obtain the same sort of gold, nor indeed any at all. This circumstance seemed in some respects to confirm the notion that alluvial gold had been released from a quartz matrix, and we searched the quartz dyke very carefully for specimens of gold, but not the smallest speck could we find in it. This absence of gold in the quartz, at a place where it was palpable in the creek, reminded me of course very forcibly of my searchings in the quartz at Goodgood, and it was quite evident that without possessing some knowledge of the art of washing one might live a life-time in a gold-field without knowing it. But this fruitless search awakened many other inquiries, and suggested the questions—Is quartz really the stony matrix from which alluvial gold has been derived? if so, ought not this gold in the creek to be merely fragmentary quartz with gold in it, since the metal is deposited close to the quartz dyke? In the solid quartz itself, ought not there to be still remaining some of the matrix gold yet disintegrated? There were plenty of quartz veins in the neighbourhood where we were located, in none of which could I ever see any gold whatever. I do not, however, allege that there existed no auriferous quartz veins thereabouts, but I do say that the solid undetached quartz rock of all which I examined in this very prolific gold district not a single dyke exhibited any visible traces of gold. Yet that there are also gold-bearing veins in the vicinity I have no doubt. My examinations at the time were merely for philosophical inquiry, since our party never contemplated commencing to work for gold in quartz matrix; the result of my inquiries was that I became thoroughly satisfied that the origin of gold in placer deposits yet remained one of the unsolved problems of science.

There were other phenomena connected with the deposit of gold in alluvia, which also arrested my attention ever since finding the flattened specimen wedged in the slates, which the digger on the back creek had exposed by scraping the bed-rock with his iron spoon. The mining claim which I had taken up near the same place was proved to contain gold in large flattened grains, which were insinuated between the vertical laminæ of the slates; and no quartz vein being discoverable on this creek, I very early began to entertain an opinion that the conformability of the gold with the bedding-rock indicated some unexplained connection between them, and that a merely mechanical deposition of the precious metal in the alluvia appeared to be just as improbable as the assumption of its mechanical release from quartz matrix. In the entire absence of associates, either inclined or capable of referring to philosophical or scientific principles, I was necessarily left almost entirely to my own thoughts on the subject. But I did obtain from Mr Hargraves more than once the observation that I must be correct in my notion that the flat gold was in some unknown way connected with the slaty bedding-rock. My own views, after abandoning the prevalent scientific hypothesis of the mechanical release of gold from quartz matrix, and its consequent deposition in alluvia by ordinary aqueous agency, oscillated a good deal between two questions —first, whether gold in a molten state had been spread over the floor, and so adapted itself in that state to the shape of the irregularities of the bedding-rock ; or secondly, whether some principle in nature analogous to the artificial process of electrotyping had not produced the flattened grains of the precious metal near the top of the slaty bedding-rock, and caused at the same time the slaty cleavage, so that each substance had some correspondence in shape to the other. I was quite aware that the formation of mineral veins was by many naturalists attributed to slowly operating electrical forces, and I thought such a mode of formation quite probable as regarded base metals; but whether or no in the several manifestations of electrical phenomena and terrestrial magnetism, some forces similar in kind to those which may be supposed to have caused metallic matter to aggregate in nearly vertical veins, might not also have caused metallic molecules of gold invisibly diffused to aggregate in visible shapes upon the horizontal surface of massive slate rock, as well as to intersect the mass in nearly vertical veinstones. This inquiry I also thought deserving of every consideration. Between these two questions—namely, whether the formation of alluvial gold ought to be referred to a natural melting process, or to a natural electrotyping process, were my inquiries principally divided, for although other hypotheses might present themselves, or be suggested by others, none but these two seemed worthy of much consideration. And to which of them I give the preference, and the reason why I do so, will be found more detailed in the public letters published in this volume.

Mr Potts and I prospected 'the neighbourhood for miles around, and selected various claims upon Sullivan's Creek and elsewhere, which were successively worked by some of our party. Our term of association at length drew to a close, and we now prepared to divide into smaller parties of two and three together, such being more convenient than associations of a larger number for the dry diggings in which we were engaged. The season had now become severe. With snow on the ground, ice on the water, and merely a light calico tent for shelter at night, the life of a gold-digger was far from being comfortable. Numbers of diggers, especially the white portion, had gone to spend the winter in San Francisco, in order to recruit their strength for another digging campaign in the spring. About half the gold-diggers in this district were coloured men, speaking the Spanish language. I had sold my biscuits in bulk, after they had been considerably damaged by the rain, at fifty cents (two shillings) a pound. All through the winter provisions had ruled very high in price at the mines; but luckily we had brought our supplies with us, and, on making up accounts before separation, we found that about twenty shillings a day had been the average earnings of each individual since the commencement, notwithstanding that we had had a great deal to learn, and that our labour had been sadly misapplied at the beginning for want of knowing better. I determined to return to San Francisco. I had now seen some of the diggings, aed I was exceedingly well satisfied with them, for although our earnings had not been excessive, yet everybody spoke in confident terms of the great quantity of gold in the river beds, which could only be obtained in the summer, when an ounce a day, it was said, would be the ordinary earnings of every gold-digger. I resolved to remain in California during the following summer, and I thought of starting early in the spring, with provisions from San Francisco, to such diggings as might then offer the greatest advantages.

Mr Hargraves remained a short time longer at Wood's Creek. He did not, however, as it afterwards appeared, again enter into any other temporary partnership for gold-digging, but shortly followed me down to San Francisco. I proceeded to Stockton on foot, the state of the roads being such as completely to stop every other mode of travel. Stockton Plains was a perfect bog, even mules had ceased to perform their journeys, and the very few things which had necessarily to be conveyed to the diggings commanded a rate of one dollar, or four shillings a pound, for the cost of transit. I became exceedingly exhausted with tramping on this journey. At one accommodation house on the road, kept by a Yorkshireman who claimed me as a countryman, I rested a day to recruit myself. During the evening, at this house, two *vaquieros*, or cattle-keepers entered, dressed in Mexican *serapes* and *sombreros*. I mistook them at first for Spaniards, but on hearing them speak English I entered into conversation. One of them said that he had been following cattle over the present gold-fields for six years before any gold had been discovered, and that he had never seen or heard of, nor had he ever suspected, the existence of the precious metal in that locality. This observation very much confirmed my opinion, that I might have been living upon a gold-field at Goodgood, and yet not have discovered the precious metal, except by employing the art of gold-washing; for I had now learnt that the examination of quartz veins afforded no conclusive proof whatever of the non-existence of gold grains in the alluvia.

To spend the summer in California, I thought it necessary to dispose of my sheep in Australia, which I felt assured would be mismanaged if I remained so long absent. Accordingly, I wrote to Capt. D——, to cause them to be sold through the agency of Mr Mort, and directed the proceeds to be invested in certain merchandise to be forwarded to me in San Francisco. I was not moved to sell the sheep because of any pecuniary incumbrance upon them, but I thought such property too precarious to be left long without direct superintendence. To Mr Pethick I enclosed in a letter several specimens of flat gold grains, and expressed in it a belief of the auriferous character of Goodgood. A few weeks later, in the presence of Mr Hargraves, who had then come from the diggings, I wrote a duplicate letter to the same effect. Mr Hargraves writing at the same time, and in the same room, and our conversation turning upon the subject of gold in Australia in general, and at Goodgood in particular, and thence referring to the shepherd's gold-findings near Wellington, and to Mr Hargraves's reminiscence of the district to the west of Bathurst, which he had seen twenty years previously, and also to what the *vaquiero* had remarked to me about his living so long in a gold district without knowing it; Mr Hargraves introduced the substance of this conversation to his Sydney correspondent Mr Samuel Peek, to whom he was then writing, and expressed himself much to the same effect as I had already before and now again written to Mr Pethick. But Mr Peek being a Sydney man of business, merely filed the letter, and took no further notice of it. Mr Pethick, as I subsequently learnt, exhibited my letters to his acquaintances, and then took no further care of them. Sheep farmers in the bush do not file their letters; but it came to pass that after the gold discoveries in Australia had progressed, Mr Hargraves's letter was exhumed from a mass of other mercantile correspondence, and published by him in Sydney long afterwards. The manuscript of it was shown to me after my return, and remembering all the circumstances under which it had been written, I have no doubt of its genuineness; it appeared as follows:—

Extract from a letter written by Mr Hargraves at San Francisco, 5th March, 1850, to S. Peek, Esq., of Sydney.

> "I am very forcibly impressed that I have been in a gold region in New South Wales, within 300 miles of Sydney; and unless you knew how to find it you might live for a century in the region and know nothing of its existence."

But that our conversation had led to this observation, and that it applied to the Western Watershed of New South Wales generally, of which I had given Mr Hargraves frequent descriptions, and that I had in writing expressed myself to the same effect at the same time, Mr Hargraves has not hitherto done me the justice to acknowledge before the public.

The Yuba River was selected as the scene of operations for the summer. I had already bought a lot of merchandise for transport thither when Mr Hargraves again joined me. The price demanded for transport of goods at this season was eight cents (fourpence) per lb. from San Francisco to the head of navigation on the Yuba. I found that I could purchase a little yacht for the same money as the freight of my merchandise would amount to, and therefore I purchased one. Mr Hargraves had been brought up to the sea, and thoroughly understood the management of sailing craft. I therefore proposed to give him, in consideration of his personal services, one-third of any profit that might accrue from sale of goods and the schooner, and further undertook to pay all costs and charges.

We met in San Francisco with a Mr Rudder and his two sons, whom Mr Hargraves had previously known in Australia. They had come from Sydney to California upon a gold-mining enterprise, not exactly to dig for gold upon their own account, but to introduce a patented machine which had not yet arrived. We had seen enough of gold-mining to show us the uselessness of any complicated machinery for gold-washing, at least while the diggings remained in their present condition, when a scramble for rich claims rather than economical methods of working was the order of the day. Mr Rudder being an educated gentleman of some scientific attainments, and a desirable companion, we solicited him to accept a free passage with us to the Yuba, while his sons remained in San Francisco. I engaged to accompany him to the nearest diggings to show him practical gold-mining, and then to return with him, for we thought the season yet too early to remain in the cold northern diggings. Mr Rudder entered into these views and proceeded with us.

We had but a very rude chart; still we navigated across the Bay of San Francisco and the Bay of San Pueblo, through the Straits of Carquinez, where is situate the city of Benicia, thence through Suisson Bay, and so into the Sacramento River, without much difficulty. Three men known to us had engaged to work their passage to our destination at Marysville, and with four large oars, or sweeps, the vessel had often to be pulled up with great labour against the stream. The city of Sacramento we visited on the way. This place is celebrated as being near the mud fort of Captain Suttor, upon whose establishment, a few miles above on the American River, the first alluvial gold had been obtained in California by a Mr Marshall in his service,—a discovery which immediately led to the opening up of the placer deposits generally by American gold-washers just after the close of the war with Mexico. Captain Suttor now lived at Hock farm, a few miles further up the Sacramento. As we afterwards passed close to the farm we observed a village of naked Californian Indians, whom we landed to see. Another village of Indians at the confluence of the Feather and Yuba Rivers we also entered. These Indians were a miserable set of beings, and had been appropriated to white masters, upon some sort of *peonage* or feudal service, little short of slavery, a state to which the early Spaniards had reduced the Indians of Mexico and Peru shortly after the first conquest. The sight of these wretched creatures quite disenchants the spectator of those romantic notions which people are led by books to entertain of noble qualities in the character of American Indians. I thought them inferior in every way to Australian aborigines. The white Americans, however, assured us that the Indians of the Atlantic States are quite a different and superior order of mortals.

The custom of occupying farming land in California offered a striking contrast with the system of selling the waste or Crown lands in the Australian colonies. The waste lands in Australia are sold by the local Government at a minimum price of twenty shillings an acre, but the newly arrived immigrant can by no means easily buy land even at that price; in the first instance he has to get with great difficulty some information of the desirable localities in the interior, and then he must cause his selection to be submitted to public auction, so that he can never buy land for less than the minimum, but may have to give a great deal more, and often, after all his trouble, never get the chosen section at all. In the United States one and a quarter dollar, or five English shillings an acre, is the price of unappropriated lands. But in California the custom prevailed to occupy any vacant quarter section (160 acres), by merely writing a notice of appropriation upon the trees at the boundary. This custom established the occupier's pre-emptive right to purchase the lot at any future time at the minimum price of a dollar and a quarter per acre, which he might not be called upon by the Government to pay for years to come. The farms were, therefore, immediately cultivated, the titles were considered good, and the negotiable value rose rapidly as population increased, so that many small fortunes were made in this way before any payment had been made to the State for the land entered upon. Valuable farms in the Valley of the Sacramento, on both sides of a navigable river communicating with the capital, were acquired in this manner. Many eligible town lots in the mining townships, which afterwards could be let at high rents, originated their titles in a similar way, often by merely registering their occupation with the *alcalde*, or locally-elected municipal magistrate. Such titles were indisputable, and this mode of acquiring town or country lots precisely resembled that of taking up gold-mining claims.

On arriving at Marysville, Mr Rudder and I at once started for the gold-diggings on the Yuba River. We first landed our stores, set up the tent on shore, moored our little vessel in the river, and then left Mr Hargraves to make sales and remain in charge until our return. We proceeded to Foster's Bar, where we stayed three days, until Mr Rudder had seen something of gold-digging. We each washed out about half an ounce of gold of a very peculiar scaly character during every day of our sojourn. Mr Rudder now became quite satisfied that the machine he was under engagement to employ was quite unfitted for gold-washing on the Yuba, and afterwards Mr Hargraves and I gave him a written opinion to that effect, for the better satisfaction of his co-adventurers, who had borne the chief expenses of fitting out the expedition. We returned to Marysville with the intention of going another voyage to San Francisco, and then returning again to settle during the ensuing summer at gold-mining on the Yuba. The merchandise yet remaining unsold was submitted to auction in Marysville, and we were again soon in San Francisco. Another assortment of goods was purchased, and Mr Rudder, with his two sons as passengers, accompanied us on the second voyage. At Marysville I engaged a team to transport the merchandise to Foster's Bar, but we now found the yacht quite unsaleable; in fact there were many boats and small craft lying in the river entirely abandoned. The first trading speculation had not been remunerative, and Mr Hargraves's share under the contract was *nil;* however, I thought this rather too hard upon him, and so I proposed to give him a hundred dollars in satisfaction of all claims upon me, requiring him first to take the vessel to Sacramento City, there to sell it to the best advantage, and then to return and join the Messrs Rudder and myself at the encampment on Foster's Bar. This arrangement was all satisfactorily accomplished.

We entered upon gold-mining a short time at Foster's Bar in a very desultory manner. One of the Messrs Rudder usually worked with me, and we divided the produce into two equal parts every evening. I had set up my own tent temporarily, intending shortly to proceed higher up the river, whither the gold-miners were already emigrating in large numbers. An exodus to some imaginary *gold lakes* was one of the delusions of the time; similar false excitements I have since frequently witnessed, but fortunately I was not attracted by this one. As soon as Mr Hargraves joined us we began to prospect the neighbouring diggings, but more especially the bars higher up the Yuba River, with the view of selecting a home for the season. The elder Mr Rudder and Mr Hargraves together took first a more extended trip, and examined the diggings as far as Downieville, being absent about a week from the encampment at Foster's Bar.

But no particular success attended their expedition. It was then arranged that Mr Rudder and his younger son, myself, and an American acquaintance should go out upon a similar prospecting journey; we accordingly visited three principal places—namely, some dry diggings in Grass Valley, Slate Range on the main Yuba River, and Nigh's crossing on the South Fork of the Yuba. Now Mr Rudder and I had lately had a great deal of controversy about the dissemination of gold in granites, and we had tried numberless experiments to ascertain the truth of the affirmative allegation. I imagined that Mr Rudder was merely expressing some peculiar notions of his own, not considering that such suppositions were yet seriously entertained and gravely taught by men of science, when the hypothesis was in my opinion and according to my experience entirely without foundation. I satisfied myself on the Yuba that, although alluvial gold resting up a bed-rock of granite possessed a character peculiarly its own, yet that the gold grains were not disseminated in the granite mass. But the phenomena of granite gold contributed materially towards theoretical conclusions; for when deposited on slaty bed-rocks, the fissile character of which is by many geologists attributed to slowly operating electric forces, the flat gold might possibly, I imagined, have been brought there into visible presence by the same electric agencies; but granite, on the contrary, being of acknowledged igneous origin, therefore rather favoured the idea that the conformability of the metallic grains with the bed rock was owing to their deposit in the melted state. I was strongly prepossessed in favour of the superior commercial value of a slaty gold-field from previous experience, while Mr Rudder was equally confident, from prejudice alone, that a granite gold-field offered the greater inducements in gold-mining, consequently I could not prevail upon him to give Slate Range a fair trial because he so anxiously wished to be on the South Yuba, where a granite bed-rock predominated. This difference of opinion caused us to separate at Slate Range, which I was determined not to leave until I had seen something more of it. I explored it further by myself, and finally selected it as the scene of future operations, and as far as its highly auriferous character goes could not have chosen better. The separation from my friends led to a strange personal adventure, which I subsequently committed to writing for the amusement and service of Mr Hargraves. It was published, with a print, in the 'Illustrated Sydney News' as follows, under the heading of A NOCTURNAL ADVENTURE IN CALIFORNIA:

"On finding my companions had ascended the mountain, I resolved upon remaining below all night to explore the river upwards in the morning. In pursuance of this object I passed through the group of stores in front of which men in slouched hats and red shirts were lounging in every variety of easy attitude on benches round a table, under an arbour of leafy branches, playing with greasy cards the favourite games of 'poker' and 'monte'—where drunkards were loudly asserting the superiority of stars and stripes over every flag in creation, and proclaiming themselves and all native Americans to be 'born princes;' I felt, under the circumstances, no disposition for the companionship of such free and enlightened citizens, nor ambition to associate with these sovereigns by birthright, and princes of the blood royal, and there being at hand no establishment of 'meals and liquors' that afforded sleeping accommodation for weary travellers, I proceeded along the path, intending to choose a retired and eligible site for the night's encampment. The path became rocky—then more rocky, and at last almost impassable—the gloom of evening was fast increasing—for on this mountain-locked river the obscurity of twilight long precedes the actual sunset. I was very tired, and seeing no prospect of a more open space, hastily selected a sleeping place between two huge rocks, the only level ground thereabouts large enough to admit the indulgence of a full stretch; then, laying down my trusty gun—unpacking my burden, spreading my waterproof poncho large enough completely to enfold a sleeper, arranging within it my blankets, and choosing the softest rock for my pillow, I flattered myself that I had performed all the chambermaid's duties as ably as circumstances would permit. The culinary department next claimed attention—so, lighting a fire, I made tea in an admirably contrived portable quart pot adapted for an infitting pint, and then began solacing and feasting myself upon hard bread, cheese, and the liquor which 'cheers but not inebriates,' after a most gratifying day's ramble over the concealed bullion vaults—the great Bank safes of Nature—amongst the most romantic and picturesque scenery in the world—during an unconstrained excursion amidst the freedom of nature, which dull city drudges wearied with the toils of bargain-driving; used-up pleasure-seekers disgusted with satiety; or pale-faced clerks listlessly pining in confined offices—might well have envied; I could not but feel, though lonely and weary, that, as a philosopher and an optimist, I ought to esteem myself the most happy of men.

"It was a strange wild spot—on either side dark mountain masses rose high overhead in gloomy grandeur; the river below fretted down the rocky slope of a small rapid, making a melody of gurgling waters; tall hemlock trees sighed cadences to the passing winds, and a formidable circle of broken rocks presented a strong barricade against all intruders.

"I lay down to rest, and thought of the danger to be dreaded from Indians and grizzly bears (they had recently been troublesome in the neighbourhood), my double-barrelled gun was examined, and laid under the poncho ready for any emergency; while I gradually grew sleepy, and reason retired slowly from her controlling influence to give place to more grateful reveries, the mind began to take an unconnected retrospect of past adventures—I recalled to memory incidents that had occurred when strolling amidst the green fields of England—when riding over the boundless plains of Australia—and when wandering amidst the cocoa-nut groves of some lovely isle of the South Sea—of the time when amongst the McIntyre blacks with my dark friend Coppe and his sable warriors, we jointly deliberated on measures of defence against our common enemy, the Myall fellows—of once visiting a village of wild Indians on the Sacramento River, and of drinking ava on a coral beach with the tatooed sons of the Pacific;—a more practical turn of thought followed—England was mentally condemned as a land divided into paddocks so small that a large kangaroo might in any of them almost leap from fence to fence—all appropriated and so highly valued that the purchase of one of these enclosures cost more than thousands of acres of freehold lands, with herds, flocks, and villages of Peons given in, in the fertile regions of California or Spanish America,—the plains of Australia were remembered as parched and dreary solitudes—and though the pleasures of savagedom might allure for a while, might benefit the invalid or the misanthropist. it was clear that the cultivated man must ever again yearn towards civilisation, and seek for enlightened and refined companionship; then, as if the mental faculties had been in debate, and the first speaker claimed the right of reply, my very last thoughts were of murderous Indians and monstrous grizzly bears, and then I fell into a sound sleep. My first returning sensation at midnight was a consciousness of the presence of light; a dim transient idea that the expiring fire had not been completely extinguished, a sense of the necessity of its extinction before it should spread amongst the dry leaves; so resolving to extinguish it, and with an effort lifting the closed eyelids, I beheld—horror of horrors!—most terrific of all terrible things—within a foot of my face, directly above me, were two searching eyes staring intensely into mine. You may have seen in melodramas a midnight assassin standing over an unconscious sleeper, his left hand holding a light, his right hand grasping the fatal steel ready to plunge into his helpless victim—such was the attitude of the form bending over me. Without time or presence of mind to use the gun at my elbow, I gave a convulsive cry—a shout—a howl unlike any human sound ever before heard (the brain, you must recollect, was charged with images of Indians and grizzly bears, and here before me was a stern reality at a time and in a place most fitting for the commission of any atrocity), if you can imagine a sound between the stifled shout of nightmare and the growling of a baited bear, you may form a faint idea of the noise on this occasion; it was not the cry of fear, nor a call for help, but the convulsive and uncontrollable utterance of absolute helplessness and despair—in a moment the extreme terror passed away, and every dormant faculty then instantaneously awoke. Some reflective men of investigating dispositions have written books upon the 'philosophy of sleep,' and have dived deeply into the mysteries of metaphysics, but no philosopher can explain all the phenomena which caused this sudden rousing of every organ of the mind. Had I been a slumberer in a feather-bed, awakened by an early summons, there would have been a turning, a stretching, and a yawning—the help of a refrigerating restorative in the water used for ablution and bibation, and then it would have required coffee, toast, and a morning newspaper before the faculties could fairly have arrived at the same active well-balanced condition for service they had thus attained in one moment. Sudden alarm has caused the dumb to speak,—has frightened the timid to death, in this case it compelled every faculty to leap into wakefulness, and immediately to discover that the eyes upon me were the blue eyes of an honest Anglo-Saxon countenance expressing neither ferocity nor mischief. After saluting each other with inquiries of what the matter might be, he told me that he was located up the river; had been purchasing supplies at the stores; had enjoyed a convivial evening, and, in returning very late at night, had carried a light, to find his way over the rough path—seeing some strange object he had approached to see if it were human, when just as he was in the act of looking down upon it, I had awakened, and frightened him with a most hideous and unearthly noise; he concluded by remarking, "I scared you some, I guess, stranger; but the noise you made scared me worse." So making some excuse for the "scaring" I had unintentionally inflicted upon him,—explaining that I had got entangled amongst the rocks, and being very fatigued, had slept there—declining a polite invitation to accompany him to his tent to "liquor," I bade him good night, and again slept undisturbed till morning.

I rejoined the Messrs Rudder on the following day at Grass Valley, as had been agreed upon, and thence we continued our travels to the South Yuba. Men's prepossessions do certainly influence their actions wonderfully, and the axiom was perhaps never better illustrated than in the course pursued by us severally after this journey. Mr Rudder chose the South Yuba as the scene of his summer's labours in gold-digging because the bed-rock there was *granite*, while I selected Slate Range for the same purpose because it was *slate*—the metallic grains reposing upon, and (as I had previously observed at Wood's Creek) the flattened gold apparently in some manner connected with the laminated slaty floor, to which it had been moulded by some natural process. There were no observable quartz veins either of the auriferous or of the non-auriferous kind at any of the places we visited during this exploration, but as usual there were rounded quartz pebbles with other drift in the gold-cônstaining rivers and water-courses.

We returned to Foster's bar, and each prepared to remove to the locality which he had selected. Mr Hargraves was unattached, and quite free to go with either of us. Whether he trusted more to my judgment in choosing where to operate, or whether any other motive influenced his choice I cannot tell, but he preferred to accept the hospitality of my tent, and to accompany me to Slate Range. And here we worked together awhile as diggers usually do, dividing our gold every evening. I did not, however, call upon Mr Hargraves to pay a *pro rata* share for the tools and outfit. These were exclusively my own. We now parted with the Messrs Rudder, and did not again meet with them in California. The elder Mr Rudder and I had had a good deal of controversy on abstract geology in connection with gold during the short time we had been together upon the gold-fields, and to his calling my attention to the doctrine of gold-dissemination in granite do I especially owe much subsequent observation which I made to satisfy myself of the relation of the precious metal to rocks of granitic character.

The channel of the Yuba River was much occupied during the summer of 1851 by Damming Companies, or associations of gold miners united together for the purpose of turning the stream to get at the gold in the river bed. According to local regulations the size of some of these river-bed claims was very large; so large as to interfere materially with independent gold miners desirous of mining in the river banks. Shares in these companies were bought and sold daily amongst the mining community, and I purchased into one of them, called the "Natchez Company." The company was composed chiefly of men from the slave states of the Union, and I had already contracted a personal acquaintance with most of them during our residence at Slate Range. The number of working proprietors was thirteen, and these generally employed an additional number of eight or ten hired men. It was understood by all at the time of my purchasing that Mr Hargraves was to be ordinarily one of the hired men. The current rate of wages to each labourer was equivalent to two pounds sterling per diem; it is perhaps necessary to inform the English reader that in America the relation of employer and employé does not imply the same degree of superiority and inferiority of social caste, as is often understood by the relationship in British communities, so that the certainty of two pounds a day may be thought by many persons preferable to the uncertainty of an unopened gold mine.

While employed upon this undertaking I received a communication from New South Wales to inform me that a younger brother from England had arrived in the colony before my sheep had been sold, but on consideration it had been decided to act upon my instructions, so that I might shortly expect the arrival in California of my brother with the merchandise which I had directed to be forwarded to me.

The works upon the Natchez damming claim were provokingly delayed by the company next below on the river backing water upon the claim by the construction of their dam. There was no remedy for this evil, since the other company had in time the priority of claim. Before the Natchez claim could be drained I thought it necessary to go to San Francisco, and therefore engaged Mr Hargraves at two pounds a day as my individual substitute to do my share of labour in the association.

The journey to San Francisco proved to be premature, but I received further advices from Australia. I found on return, great changes had taken place during my absence of ten days from Slate Range. The dam and race of the Natchez claim, after several mishaps, had been so far finished as to allow of a very imperfect examination of the river-bed for gold. This not proving satisfactory, and the season being now far advanced, a consultation had been held to consider the question whether to endeavour to drain the river more completely before the winter, or to postpone all further work upon it until the following season, and the latter plan had been adopted. The proprietors then all began to mine in the River banks, each on his own account, and as an individual miner, my own success was tolerably satisfactory at Slate Range, during the remainder of the season my earnings being about an ounce of gold per diem. Even before this success when our joint work was suspended, I had been individually in tolerably good luck, and upon one day in particular had obtained nearly twelve ounces of small gold, worth upwards of forty pounds sterling, this day's work being the best paid single day I ever experienced in gold-mining. The preceding winter had been exceedingly severe, when a heavy fall of snow had thoroughly cut off all communication through which supplies could be obtained; lest the same interruption should this season take unawares the gold-miners at Slate Range, it was generally resolved to abandon the place on the first day of November. A mule train was engaged for the occasion, which came at the appointed time to remove us. I was occupied upon a capital claim at the time of its arrival, and dug my ounce of gold a day to the very last. A great deal of property in the way of tools and tents was abandoned by the diggers, as not being worth the cost of transport. Some diggers especially delighted in setting fire to their tents and making a good blaze out of mere wantonness. The miners were all in a state of excitement consequent upon the general break-up of the encampment—some to spend the winter in San Francisco, some at the Southern diggings, and some at the Sandwich Islands. The expected arrival of my goods made it necessary for me to remain awhile in San Francisco, but Mr Hargraves having left a wife and five children in New South Wales, his thoughts turned upon the necessity of return, and this intended return to the colony was pretty generally known amongst the Americans. We had of course often again conversed on the subject of gold in Australia, and now that he thought of returning I impressed upon him the advantageous opportunity of making an examination for gold, especially upon Goodgood. One of our American acquaintances jocosely shouted to Mr Hargraves, "There's no gold in the country you're going to, and if there is that darned Queen of yours wouldn't let you dig it." To which Mr Hargraves, first taking off his hat, and assuming a theatrical attitude, replied, in a highly heroic strain, "There's as much gold in the country I'm going to as there is in California, and her Most Gracious Majesty the Queen, God bless her, will appoint me one of her Gold Commissioners;" and then, turning towards me, added, "when I shall get my friend Davison here a like appointment." This speech, and the style of its delivery, caused a good deal of merriment, and the air of patronage was especially amusing and flattering to me. It expressed, however, the substance of our previous conversations. Mr Hargraves had before expressed his willingness to buy a horse and go "prospecting" for gold in Australia when I had urged "Goodgood" and the "Peel River," as well as the Wellington district, upon his especial notice. The appointment of a Gold Commissioner had from the first mention of the subject been Mr Hargraves's ambition as a reward. It was my advice (knowing as I did, Mr Hargraves's disrelish of prospecting and his indifference to geology), that so soon as he should in Australia wash out the smallest quantity of gold, he should apply for such an appointment, and leave the exact spots of the richer patches of alluvial gold, that is, the placer deposits, to be determined in time when the number of gold-washers increased, as we foresaw that they would be sure to do so soon as the first rumour got abroad. There appeared to be great danger of being forestalled with the Government in giving information, and to keep the matter entirely secret we judged to be an impossibility. An issue of licences to dig for gold was to be one of the first regulations, and a Gold Commissioner of Administration to be the appointment, according to our plans, and not a Gold Commissioner of Exploration, as Mr Hargraves afterwards became. The humorous address made on the day of our leaving the Yuba enabled me subsequently to say with the strictest literal correctness that Mr Hargraves had offered to make me a Gold Commissioner so soon as he should be appointed one himself, and my statement of the fact served him very materially on future occasions, although the drollery of the circumstances under which the offer was made has seldom before been explained.

We left the Northern diggings and reached San Francisco again. We first went to the house of a colonial acquaintance, by name Mr Underwood, and Mr Hargraves now began to inquire after the vessels laid on for Australia. At Mr Underwood's house I wrote the promised letter for Mr Hargraves's service in gold-seeking, so soon as he should arrive in Australia. This letter (an open letter given to Mr Hargraves) was addressed to Mr Pethick, whom I had left in superintending charge of my sheep station at Goodgood. Mr Hargraves had an idea that he could seek for gold in Australia, and yet keep secret the object of his search. I was of opinion that such a course was utterly impossible. The inquisitive character of shepherds concerning every occurrence on their runs was familiar to me, and it could not fail to be known in the neighbourhood of Mr Hargraves's search, that he had come from California, the notorious gold country, and was now examining the soil of Australia for something. It was then morally certain that whether he really found gold or not in the first instance, popular rumour would assert that he was digging for gold—the shepherds after he had left would examine the holes he had dug, and with the ordinary love of the marvellous and the passion for exaggeration, it would probably be alleged by them that he had found and was secretly conveying away the precious metal in large quantities. My advice therefore was, that he should make Mr Pethick his confidant. I recommended Mr Pethick as a man of sterling honesty in my estimation, while I represented strongly to Mr Hargraves the necessity of his application to Government immediately he should find gold upon the slates of Goodgood, *without any reference to the quantity which he might obtain*, since prospecting was not his *forte*, and these views were in practice subsequently adopted by him.

No mention whatever was made at this time of any intention to examine first the Western Districts of New South Wales. Mr Hargraves had been there but once seventeen years previously, and though he had mentioned the circumstance when the shepherd's gold-findings near Wellington had been the subject of conversation, yet, as we had not seen any *auriferous* quartz veins, to know them as such, during our joint explorations in California, the gold-collections of the shepherd made by breaking the metal out of *white flint*, had therefore in our deliberations become a fact of less weight than the general aspect of the auriferous interior of Australia, with which I was most familiar, and the geological connexion of the precious metal with such slaty and granitic bedding rocks as I knew to abound there. That Mr Hargraves did eventually make his first trials in the

Western Districts is, I believe, entirely attributable to his seeing afterwards in Sydney samples of the precious metal in the matrix from auriferous quartz veins, which had been already discovered in the districts beyond Bathurst.

Mr Hargraves met with a vessel just on the point of starting for Sydney, and embarked hurriedly whilst I was making some inquiries in the city. It has since been stated by Mr Hargraves that I promised to follow him to Australia immediately I heard of his success, but his final sudden departure prevented the definite arrangements, as well as the mode of communication from being completed.

My goods and my brother together at length arrived from Australia in the barque " Eleanor Lancaster." No market is more liable to extreme fluctuations than was that of California, and the merchandise which I had ordered when fabulous prices were ruling would now barely cover first cost. The extreme fluctuations in prices which occur in California seem to me much aggravated by the system of cash payments adopted there, which contrasts with the extensive credit system prevalent in Australia. Even the local bankers in California are prohibited by the State Constitution from issuing paper credits, that is to say, bank-notes, while in the colonies the joint-stock banks are establishments of great influence, and one of them alone (the Bank of New South Wales) now issues "promises to pay on demand" to the extent of nearly a million pounds sterling. One might have supposed that political economists would have agreed before now as to whether a system of bank credit is a good or an evil to a community, and yet here is the paradox of two countries very similarly situated in their commercial relations with their respective parent States, and in the production of the precious metal; yet the one utterly forbids a bank credit system, and the other highly approves of it. The one insists upon a metallic currency, and the other advisedly adopts a currency of paper credit. The Government of New South Wales now issues gold coins from a local mint, but the more profitable issue of local paper money is yet a privilege and a monopoly enjoyed by the joint-stock banks in the colonies.

The disposal of my goods led to other mercantile speculations. The latest speculation in which I engaged was to buy up every invoice of certain brands of English ale and porter in wood as the shipments arrived in California. I found this adventure very profitable and successful for some time, when one of those overwhelming calamities which no foresight can avert suddenly changed the aspect of affairs.

The city of San Francisco was built at this time almost entirely of wooden houses. The streets were paved with wooden planks, and even the very drains were constructed of wood. The natural consequence of employing this combustible material was that disastrous fires occurred very frequently, and to guard against the evil some of the more important buildings were built, at a prodigious expense, entirely of bricks and iron, to render them what was considered *fire-proof*, while a great deal of merchandise remained permanently afloat in store-ships in the harbour. Such was the state of San Francisco in 1851, when one of the greatest conflagrations which the world has ever witnessed occurred on the 4th of May, and reduced the whole city to ashes, destroying moveable property of the estimated value of ten millions of dollars, and leaving but a few suburban houses and a charred waste to indicate the spot where the busy city of San Francisco stood on the previous day. My goods at the time were upon storage, according to the local custom, and in three different places. One lot was in a supposed fire-proof bonded store, another lot in a brick and iron building, and a third parcel afloat in a store-ship. The two first were destroyed by fire, while the third lot unfortunately was the only one upon which a lien existed. The two former had been fully paid for, and I suffered the total loss of their value. I had also a considerable pecuniary balance in the banking-house of Wells and Co., whose building was universally considered to be *fire-proof*, but this too was burnt and all their papers and books destroyed; a suspension of payment by the bank of course followed this disaster.

I was now in considerably reduced circumstances, but not more so than thousands around me. As one compensation for my loss, the value of that portion of my goods which remained unburnt just doubled itself, but before this value could be realised I had to find a friend in need to pay off the lien. I am thankful to say that more than one friend came and voluntarily placed the needful sum at my disposal. These stirring events occurred just about the same time when Mr Hargraves was in Bathurst, proclaiming the gold fields of Australia, by authority of the Government of New South Wales. The first report of the alluvial gold-findings in the colony reached me a few weeks after the great fire. A newspaper paragraph was shown to me, in which it was stated that Mr Hargraves had received five hundred pounds for the gold discovery, and that a Mr Hardy had been appointed Chief Gold Commissioner. The paragraph was so worded as to leave the reader to suppose that five hundred pounds was the whole of the intended reward, and as I understood it, had been given to him in lieu of a Commissionership. I expressed to all my friends there my opinion of the extreme injustice and inadequacy of the apparent recompense, and I sympathised cordially with the seeming disappointment of Mr Hargraves in the matter of the Commissionership. But subsequent accounts soon showed me that although a Mr Hardy had really been appointed Chief Commissioner, yet that Mr Hargraves had obtained some similar appointment without the humiliation of being subordinate to the former, and I sincerely rejoiced to learn it. Here is an early announcement of the event in the 'Alta California' newspaper in 1851:

From Sydney.

By the arrival yesterday of the British barque Black Squall, Captain Bowden, 84 days from Hobart Town, we have received a copy of the 'Empire,' printed at Sydney on the 17th of May last.

There appears to be some excitement relative to recent discoveries of gold in the Bathurst District, but beyond that there is not a word of news. We are slightly incredulous as to the gold story, but that our readers may make up their minds upon the subject, we quote from the 'Empire' as follows:—

The Diggings.—The interest excited by the gold discovery is increasing every hour. Go where you will, the invariable question is, "Well, what do you think of the ——— ?" Of course it is expected that you will supply, in your own mind, the words 'gold discovery.' Within the last twenty-four hours we believe about two hundred persons have started for the diggings, some of them on foot, with their tin pots and stock of provisions slung across their backs. Hundreds more are also on the eve of departure, many of them only waiting for the news by this morning's mail to confirm them in their determination. Upwards of forty persons were yesterday booked for Bathurst per coach, at Mr Titterton's, being about five times the number usually entered within the same time. Taking all these circumstances into consideration, and making due allowances for visitors by private conveyance, and the large number of persons who have left, and who are daily deserting the sheep stations in the interior, the influx of population into Bathurst must have been immense. The most of those who have gone have, we believe, formed themselves into small parties for greater protection, which, no doubt, is the wisest course that could be adopted under the circumstances. There can be very little doubt that much difficulty, confusion, and disappointment, will have to be encountered in the outset, especially by those who have not been initiated into the mysteries of gold-washing. Mr Hargraves stated in his letter that those engaged in digging had already lost much gold from the want of an accurate knowledge of the process of washing.

The lump of gold brought to town by Mr Austin has been extensively exhibited. During yesterday we heard of it in all quarters of the city; and though a suspicion obtained some currency that it was in reality from the Calfornia mines, there does not appear to be any good reason for doubting its genuineness. It is a lump, of irregular shape, about three inches long, with a small portion of quartz in about the centre. Other specimens, as we have said, will doubtlessly arrive to-day.

Mr Kite, who arrived from Bathurst yesterday, reports that all the shepherds had deserted from his stations. This desertion is not confined to Mr Kite's stations, but was becoming general. Several influential gentlemen have proceeded to the gold district, and others, including some of our leading merchants, are preparing to follow. A few days will give us a year's history of this important discovery.

Misfortunes, it is said, never come single, and although I had suffered so much from the great fire in May, I was again the victim of another fire in June following, when the only one lot of merchandise I possessed, which was stored in a detached warehouse in the city, was totally destroyed by the devouring element on a Sunday morning. I had previously begun to prepare for leaving California, and this disaster accelerated the matter; my great desire now was to visit England before returning to Australia. The line of Panama steamers and the West India mail steamers being in full operation, little or no time would be lost, I considered, by taking that route to the colonies, while such a course would afford me the advantage of getting late advices in England from Mr Hargraves and other friends in Australia. I wished my brother to return direct to Sydney, and he accordingly took a passage in one of the several vessels then laid on for Sydney, since many gold-diggers were now returning to try the gold-fields of Australia. I sent with my brother some letters of introduction, and amongst the rest was one to Mr Hargraves, in which I reminded him of his engagement to me concerning the Commissionership, and requesting that he would, instead, serve my brother in any way that might be in his power. This letter will be alluded to again in this volume, but my brother, on presenting it, thought himself ill received, and in consequence never accepted any favour from Mr Hargraves. Another letter I gave my brother to my friend Mr Rudder, but Mr Rudder being perfectly unacquainted with Mr Hargraves's intention of being appointed a Gold Commissioner, I did not in any way allude to such an appointment for myself in addressing him. This letter came afterwards again into my possession. It runs thus :

San Francisco, 22nd Sept., 1851.

SIR,

I beg to introduce to you the bearer, my brother. Any advice, assistance, or information you may give him will be regarded as an additional favour towards myself.

I am about going to England, and shall be much obliged if you will forward to me information and particulars about the gold mines in New South Wales immediately on receipt of this communication; address to the care of "R. Davison, Esq.," Burlington, Yorkshire, England, as I propose returning thence to the colonies, probably with Coolies either to wash for gold or to enter upon sheep-farming again.

I have seen in the papers that you have been giving geological lectures in Sydney with reference to the gold mines, and I much regret not finding a full report of them.

Our friend Mr Hargraves must have turned his experience in California to profitable account. I have been told that he has been appointed a Commissioner, but I have not yet seen it in print.

Quartz-crushing is occupying a good deal of attention in California. I have never seen any crushing machines yet, but I intend doing so before going to England, so as to be completely master of the business.

My kind regards to Mr Julius and to Mr Augustus,

And believe me, Sir, yours truly,
S. Davison.

E. W. Rudder, Esq.

My brother left California, taking a few goods with him, and I proposed purchasing and sending as many more as my means would allow before going finally round the mining districts to observe the method of quartz-mining. I wished to examine the quartz veins, more especially since a sort of mania now prevailed, and people reasoned that as quartz was the matrix of gold, and according to the men of science alluvial gold had been disintegrated from it, that therefore the gold-bearing quartz veins, the source itself of gold, would prove to be at last the more permanent and productive interest, as compared with gold-mining in placer deposits.

I had just made some purchases for shipment when the crowning misfortune befel me of all these Californian mishaps. The banking house of Wells and Co. had since the great fire lately resumed payments, and established itself again in public credit. The amount of my pecuniary claim upon them had been admitted and placed to account, when suddenly they suspended payment a second time, in consequence of their correspondents in the United States dishonouring their drafts after news of the great fire had reached them, and not until some years had elapsed after the second stoppage did the creditors of Wells and Co. receive any dividend upon their money deposits.

I was now under the disagreeable necessity of deferring my intended voyage to England, nor could I even go direct to the colonies, as well for actual want of necessary pecuniary means to do so as for my reluctance to leave the credit account with Wells and Co. so unsettled. In a country so eminently free as California, where manual labour is esteemed to be less degrading than in any of the old countries of Europe, the grand resource in such exigencies is of course to go to the gold-diggings. The gold-diggers were in truth the aristocracy of the land, and no calling was there accounted more honourable. The ruined merchant who had never known physical labour constantly sought change of scene and change of fortune at the gold-diggings, and shouldered his blanket and tools without the shade of a notion that he lost caste amongst his equals by employing himself in laborious occupation. On the other hand, when the gold-digger desired a change of life, and sought some vocation in the city, he generally consulted only his own feelings in choosing one for himself, for being obstructed in his aims by few or no hindrances of conventional usage or class privilege, he would constitute himself a merchant, a doctor, or a lawyer, according to his own opinion of his own qualifications, and with very little reference to previous training. The liberal professions therefore, if not very ably administered in California, were at least not unfairly exclusive, since they were open to all, while merchants and gold-diggers continually changed their relative positions.

I had hitherto gone to the gold mines both to satisfy a philosophical wish to examine them for myself, and to gratify a desire for personal adventure. The expectation of "making a fortune" by individual gold-digging had never been a leading motive with me; indeed a very superficial observation satisfies any one whose notion of a "fortune" is beyond that which a peasant may entertain, that the earnings and savings of a gold-digger never amount to a fortune worthy of the name, although the sum gained may be an exceedingly high remuneration for the bodily labour employed to obtain it. All the large fortunes in all the gold countries have been made either by trade, by land speculations, or by being the previous possessor of property which increased enormously in value by the presence of a gold-digging population. But if I had hitherto gone to the gold mines for other motives than immediate gain in money, I now went to the diggings a third time because my pecuniary circumstances compelled me to go. The only alternative was to become a city hireling of some sort; but where is the free and skilled independent gold-digger—where is the man of ordinary self-respect, who would voluntarily become a clerk or other employé on any terms while the freedom of a gold-digger's life remained open to him? To my mind it ever is "better to be an uncouth savage in the free wilderness than the Caliban of City Prosperos." Perhaps the wild freedom of bush life in Australia, no less than contact with American independence, had impressed me with an extreme abhorrence of servitude and subjection of every kind, not excepting the easy occupation of a well-paid clerk. At any rate, in this emergency I once more started for the gold-diggings. I had found a companion who disappointed me at the last moment, and so I proceeded this time alone, and entirely among strangers. I had already been at the Southern mines, and at the Northern mines, but the world being now all before me where to choose, I chose between the two extremes, and selected my temporary home at Mokelumne Hill, of which I had previously heard some account. At the city of Stockton, again, I met a so-called unfortunate digger just returning thence, who, as usual in such cases, gave me the most gloomy accounts of it. "Go to any diggings in California except Mokelumne Hill" was his advice, but I had seen too many self-made unfortunates of this class to be in the least deterred from my purpose by what he said. I engaged with a teamster to go up in his mule waggon. On the road, at one of the inns, I met with a young man from Australia going to the gold mines with a trading adventure, which he was conveying to Mokelumne Hill on a train of mules. On comparing notes we found that we knew many of the same people in the colonies, so we struck up a sort of acquaintance. My new acquaintance did not intend to remain at Mokelumne Hill, and as he was deficient in tent accommodation, and I had brought up a good tent with me, I offered him the partial use of it so long as he should stay at these diggings. This proposal he accepted, and so we parted, agreeing to meet again at our destination. Accordingly at Mokelumne Hill he joined me, and shortly brought his goods to auction, and then returned to San Francisco; but in the meantime he had unexpectedly met with a Mr Bell, a familiar acquaintance from South Australia, who was building a large weatherboard house at the township, and Mr Bell wanting a mining partner, he and I found it to our mutual benefit to associate for the purpose of gold-mining. Mr Bell proved to be an excellent partner, and we remained together on the best possible terms during all the while I remained in that neighbourhood.

The Mokelumne Hill gold mines were of quite a different style from any which I had yet experienced. The bed-rock was reached by the miners on sinking round shafts through a very white substance, which was popularly called "lava," and at depths varying from fifty to a hundred feet they met with the washing stuff resting as usual immediately upon crystalline, schistose, and slaty bed-rocks. But the gold was also deposited in certain channels, which the miners here termed "*leads*," and these leads, which were situate upon very high land, could scarcely be supposed to be ancient river-courses. The volcanic origin of the hills, the great elevation of the leads, and many concurring phenomena, had here led the ordinary gold-miners, contrary to the popular opinion in many diggings, to refer the origin of alluvial gold to volcanic agency. There were no auriferous quartz veins in the immediate vicinity of the great leads of gold on Mokelumne Hill, but within a radius of a few miles there were several gold-bearing veinstones of quartz, and I now took frequent opportunities of visiting them for the purpose mentioned in my letter to Mr Rudder. Many of my acquaintances among the gold-miners here had had a trial at quartz-mining, but they all to a man condemned the employment as unprofitable upon a small scale, still there existed among them the feeling that gold-mining in veinstones would some day, when exhausted gold-fields would less amply repay the gold-washer's labour, and when powerful machinery should be employed upon it, prove to be an occupation of great profit for capitalists. Some steam machinery was erected upon an auriferous quartz vein at Rich Gulch, but the greater number of those which I here examined had been merely quarried into, and were held by the miners in anticipation of a more general introduction of machinery and capital.

My first prospections led me up and down the Mokelumne River, which had been much dug over during the previous year; then I prospected upon the Calaveras River, and lastly, over many of the smaller tributary creeks and gulches of the two leading rivers. Gold was everywhere to be found, although none of these localities was altogether satisfactory; but to sink a deep shaft on the hill seemed too formidable a work for two persons. However, at length Mr Bell and I resolved to dig a shaft upon Corral Hill, and after spending upwards of a month of very hard labour upon the undertaking, we experienced the disappointment of a total failure. Again we followed the various rushes of the miners, and took up claims upon deep sinkings, without heartily entering upon digging another shaft at any of them. Perseverance, however, conquers formidable difficulties in gold-digging as in every other enterprise, and one evening, on returning towards home, we came upon some of our old friends at Corral Hill, who were just trying their first wash dirt after sinking to the depth of seventy feet. Their washing proved to be a very good prospect. The ground all around their claim was vacant, and we knew almost to a certainty in which direction the lead continued. We immediately staked out a large claim, and did as much labour upon it that evening as would secure our title to it, being certain that on the following day there would be a general rush to the vicinity. Mr Bell and I agreed that the undertaking was too much for two persons, and that as the claim we had taken up would be in good repute, we might choose amongst our acquaintances as many more associates as we thought proper. We accordingly admitted a Mr Walden from New York, and a Mr Bjornson from Copenhagen, into partnership, and it was arranged to work in alternate couples, night and day, until the shaft was completed. It proved much easier sinking than the one we had first dug, although at no great distance from it, and within a week from commencement we reached the bed-rock, where we found very good washing-stuff at a depth of seventy-five feet from grass. Upon this claim we worked several months, in fact during all the rest of the time I remained in California, while the average earnings of each of us amounted to upwards of half an ounce (or two pounds sterling) per diem. There were a few days during heavy rains when it was more profitable to wash for gold in what are technically called "surfacings" with long-toms (machines of which I had heretofore only heard), and we frequently, although for a day or two only at a time, left our permanent underground excavations to take advantage of the abundant supply of water to surface.

From time to time random news of the gold-fields of New South Wales reached Mokelumne Hill, but for the most part it was not of a sufficiently encouraging nature to be at all attractive to a mining population resident upon such a rich gold-field as Mokelumne Hill. Some letters from experienced Californian diggers in Australia were shown to me, giving the most lamentable accounts of the poverty of the Turon River, and other of the first discovered localities. I could not expect to receive any direct communication from Mr Hargraves, for I had written to him of my intention of going to England, and there, as I afterwards learned, he had addressed letters to me. At length we began to hear rumours of the finding of much richer gold mines at Balaarat and Mount Alexander, somewhere nearer to Melbourne than to Sydney, and I soon received an awakening letter on the subject from an unexpected quarter. Among the passengers with Mr Hargraves and myself in the "Elizabeth Archer" there had been a Mr Bowden (now of the firm Bowden and Threlkeld, in Sydney), then venturing on mercantile pursuits to California; and he having, like myself, some unsaleable puncheons of rum on board, had shipped them off again to the colonies in the same vessel as that in which I had sent mine. This gentleman was now my correspondent, and wished to hand me over the proceeds of the sale of my rum, which I had almost given up for lost, so long had been the time which had since elapsed. Mr Bowden being now in San Francisco, I replied to him, and received a second letter, giving me further details. The date is the 5th of June, 1852, and he writes thus: "You should lose no time in getting to Sydney or Port Phillip. . . . I have seen Sydney papers by the last arrival, which contain astonishing accounts of the abundance of gold. From one mine (Mount Alexander) the weekly escort of mounted police brought down eleven thousand ounces in the early part of February. The ship "Wandsworth," for London, 16th of February, had twenty thousand five hundred and eight ounces on board. . . . I dare not write you the intelligence contained in a letter to Hort Brothers from their father in Melbourne, but when you come to San Francisco ask Mr Hort to show it you. . . . Hargraves *is a Gold Commissioner* and a J.P., with a good salary and a roving commission to prospect. Rumour says he has obtained leave of absence to go to England for the purpose of being knighted.—Yours truly, T. W. Bowden." This account of Mr Hargraves was in reply to my direct inquiry. There was also an enclosure of an older date, from Capt. D——, of Sydney, in which allusion is made to the gold discovery, and to the first grant of five hundred pounds to Mr Hargraves. The date is Sydney, 10th of July, 1851, and these are the words:

"Our gold discovery has no doubt reached you—your old partner has acquired great notoriety and substantial reward from the Government for the discovery."

The information conveyed in these letters was of course made known generally amongst the gold-diggers, and an exodus began from Mokelumne Hill to Australia. My own resolve was now made, and an accident happened very opportunely upon our claim before the gold had been half dug out of it. By inadvertently opening a communication underground with some deserted mines, several hundred tons of water suddenly rushed into our adits, and two of the party very narrowly escaped with their lives. This misfortune could not be remedied without a vast amount of labour, so I took the opportunity and resolved to go direct to Sydney. The accident happened one afternoon, and I started with a party of Americans for San Francisco and Australia on the very next day, making a present to Mr Bell of my tools and of my share in the claim. Two American friends on my persuasion came with me as far as San Francisco, but on making inquiry amongst American merchants and settled residents in the city they found that these spoke very lightly indeed of the Australian gold discoveries. "Yes," they said, "no doubt some gold has been discovered, but as to there being really any gold-diggings, it is all exaggeration." All the Americans in the city whom they consulted, without exception, dissuaded their countrymen from going to such an outlandish place as Australia, which they alleged was not a free country, and that American citizens were there especially persecuted. The fact is, that much better information concerning Australia had obtained currency among the gold-diggers up the country than was in possession of most of the city residents, but as it often happens with people in doubt, my friends asked advice from those who knew less than themselves.

I took a passage for Sydney in the American ship "Orpheus." A good many Mokelumne Hill miners were on board. The passengers consisted of about fifty individuals who had the privileges of the cabin, with about thrice that number in the steerage. The only occurrence of importance was that of calling at the Navigator Islands, and this delightful episode deserves a special notice.

The group in the Pacific known as the Samoa, or Navigator Islands, was discovered by the French navigator De Bougainville. They may be considered as constituting a subdivision of the Friendly Islands of Captain Cook. The Samoa group consists of four principal islands—namely, Manua, Tutuilla, Upola, and Savai. The "Orpheus" first cast anchor at Manua, and of course we landed as soon as possible. The natives here we found were all Christians, with books printed upon a phonetic system, in Roman characters, and yet, singularly enough, there were no white men on the island, the people having all been taught by native teachers from Tahiti. There is not perhaps a more triumphant result than this fact in the annals of missionary enterprise. The loveliness of these islands has never been too highly coloured, for it exceeds in truth all poetic description. Their natural beauty is surely the nearest approach that can be to paradise upon earth. All that my youthful imagination had ever pictured, all that Cook's voyages had ever impressed upon my boyish fancy, and all the glowing ideas which I had ever gathered from descriptive books, had never surpassed the glorious reality. I have generally found the contrary to be the case in other countries, but here the tropical vegetation, the genial climate, the smooth sea, the engaging people, were all most charming and romantic. After spending an agreeable week at Manua, we coasted along Tutuilla, and then entered Apia harbour in Upola. Here we remained upwards of another week. We took excursions into the interior and visited the farm of Mr Pritchard, the Consul, and thence went to view a remarkable waterfall seven miles inland. We sought for gold on this occasion, but found no indications. Amongst the vegetable curiosities of these islands wild nutmegs and wild oranges were the most remarkable, besides an abundance of the ordinary edibles, such as bananas, bread-fruit, cocoa-nuts, yams, taro, &c. &c. Leaving Upola the "Orpheus" stood off and on, near the large island of Savai. Innumerable canoes filled with natives visited us on every occasion. Our long stay at this group was occasioned by the captain of our vessel, who, intending to call again on his return from Australia, to take in a cargo of pigs and fowls for the market of San Francisco, had now to arrange with the native chiefs to collect them. I did not by any means regret this delay. The natives are a most interesting people, and a very superior race to either the New Hollanders or the Californian Indians. If a fine climate, simple wants, light labour, and beautiful scenery can produce happiness, then the islanders of the South Sea must possess that blessing most completely. The traveller can scarcely look upon their condition without indulging a desire to forego the boasted benefits of civilization, and it really may be doubted whether the average happiness of man in the civilized state equals that of these favoured people.

I learnt for the first time on board the "Orpheus," from a passenger of a geological turn, that Sir Roderick Murchison had in England predicted something about the gold-fields in Australia before their discovery.

I entered Sydney harbour once more, in September 1852, after an absence from the colony of upwards of three years. The pilots informed us that the produce of gold exceeded anything that had ever before been heard of. What wages are going in Sydney? demanded my American friends. About ten shillings a day was the reply. Then the gold-diggings can't be very good if the current wages are only ten shillings a day, was the rejoinder, for on our leaving California wages were there at least twice as high. This paradox was attempted to be explained upon the theory of a settled population being in one country and nomadic adventurers only in the other. We soon gathered the information that the gold-fields of Victoria were the grand point of attraction. Still many anomalies presented themselves to us. Gold, it was said, was being dug out in Victoria by pounds, and not by ounces as in California. Yet all the city residents in Sydney bitterly complained of the high rate of wages, the great cost of necessaries, and the difficulty of obtaining servants, when to our different view all those wants appeared to us under the circumstances to be supplied exceedingly cheap and reasonable. We had been accustomed in California to judge of the productiveness of gold-fields by their effect upon the prices of labour; and here, while the gold-fields were alleged to be more prolific, the price of labour was far below the Californian standard. "I don't know what Sydney will come to," said one lady to me; "my laundress now wants to impose a charge of four shillings a dozen for washing." I told her that the usual charge in California was equivalent to *twenty-four* shillings a dozen for washing. Many similar complaints equally groundless were continually brought before us, while we were astonished to find that prices had risen so little if the accounts from the Victoria gold-fields were reliable. I soon learnt that Mr Hargraves was proceeding to Victoria overland on duty as Crown Commissioner for Exploration of the Gold-fields. My American companions were all going to Victoria, so I embraced the opportunity of going with them. The first White Hill at Bendigo had been recommended to us as good ground for hill-digging miners, and the very name was attractive to us who had just come from the White Hills of Mokelumne. I remained only a short time in Sydney, and saw but few of my former friends. I sent a letter to the official address of Mr Hargraves, announcing my intention of being shortly at the first White Hill, Bendigo, and expressing a hope that I should see him there. We tried to engage passages on board the "Conside" steamer, but she was full, fortunately for us, since she was wrecked on that voyage to Melbourne. We secured cabin passages on the steamer "Shamrock" at ten pounds each, which we thought very reasonable in amount for a gold-mining country, only we had to pay the fare several days beforehand to secure berths. The approach to Melbourne up the harbour of Port Phillip, though less romantic in scenery, impresses the traveller with a more favourable idea of the fertility of the land than the entrance to Sydney. In the month of September the landscape there is covered with a verdure that reminds one of old England. The bustle of the city was San Francisco over again, with some slight differences; for instance, the inns were considered to be full in Melbourne when one person only occupied each room in the house, whereas in California, during the great rush of population, sleeping berths in the houses were fitted up one over the other in ship fashion, so that any number could be accommodated in a rough way. We went all over Melbourne, and had great difficulty in getting lodgings upon any terms. We stayed only two days, when some of our party bought a horse and cart, while the others agreed to pay them the current freight, which was then one shilling per pound for transport of baggage and provisions to Bendigo; so we proceeded together. I made a detour to inspect the gold-diggings on Forest Creek, near Mount Alexander, where I called upon a Mr Boursiquot, whom I had previously known in California, and got a great amount of information from him. We met the usual complement of *soi-disant* unfortunate diggers leaving Bendigo, amongst whom were some Mokelumne Hill men personally known to some of us. When we came to an explanation of their unfortunate circumstances, they admitted that Bendigo was "good for an ounce a day yet;" but in these good times they said an ounce of gold, that is, nearly four pounds sterling a day, did not satisfy them, and so they were going to try for better luck on Moonlight Flat. The cost of living for a week at this time certainly did not exceed one day's earnings, or about three pounds a week, so that it appeared an unlucky digger was only to be understood relatively to the great prize-finders.

We pitched our tents near the first White Hill, and I went out with a companion to prospect. The first man we met told us the ordinary tale—namely, that all the gold was dug out, and that we had arrived too late. The first hill was certainly abandoned by the crowd of miners who had moved downwards towards the fifth and sixth white hills. However, on entering several shafts of deserted claims on the first hill, I was very well satisfied with the examination. My experience in hill-digging and underground excavation here proved to be of great service to me. I saw with professional eye that many of the claims had been worked by inexperienced miners, and that therefore a great deal of virgin ground yet remained to be dug. Other of the claims had been operated upon by Cornish miners, and it was striking to mark the difference of workmanship. I began digging on the first White Hill with one companion, and from the first we found it to be the most steadily remunerative and comfortable digging that could be desired. The excavations were white, dry, and clean, the miner was equally protected from the sun, sheltered from the rain, and unannoyed by dripping water, while the gold was generally spread on the floor beneath the whole hill. There did not appear to be any distinct lead or line of peculiar richness in gold, but the richer spots were disposed in irregular patches. The white hills here differed from the white hills of Mokelumne, in being hills of conglomerated round quartz pebbles reposing upon a soft white bed-rock, while in California the hills themselves were in a great measure composed of a similar white substance, and rested upon ordinary bed-rocks of slate, schist, and granite. The neighbouring watercourses at Bendigo were many of them even richer than the hills in gold deposits, though those in the immediate neighbourhood of the White Hills were not especially prolific of gold.

There were also a great many known auriferous quartz veins, or, as they have since been more popularly called, quartz reefs, at Bendigo, and I collected quite a number of specimens from them. Bendigo was a very rich gold-field, and during the four months of my being there my individual gains ranged from two to ten pounds sterling per diem, making an average of upwards of an ounce of gold, or about four pounds sterling for every working day of my gold-digging experience at Bendigo. The gold deposits there offered another geological problem, and no theory seemed to meet the phenomena in all respects. The general aspect of the diggings was not such as could be called volcanic in a popular sense, neither were the bed-rocks generally such as geologists would consider igneous rocks; it appeared even doubtful whether or no the soft shaly white bed-rocks under the White Hills were of the metamorphic class, but possibly what Murchison describes as bands of finely levigated volcanic grits, and no fossils had been found in them. The one great fact upon which I had argued in California when directing Mr Hargraves to seek for gold in Australia upon slates because the precious metal was so often found moulded upon them, scarcely could apply to the White Hills, since the white floor was too exceedingly soft, and the gold grains even in the richest spots were so small in size. But still, where larger nuggets were found in surrounding diggings they exhibited the appearance of having been melted upon the floor, no less than did the flattened gold grains upon a floor of slate in the other localities which I have treated of. The doctrine of the origination of placer deposit gold by release of the metal from a quartz matrix, by abrasion or decay, seemed quite as inapplicable at Bendigo as elsewhere. None of the many perfectly rounded quartz pebbles there were gold-bearing fragments of quartz, as one might suppose that they ought to have been, when accumulated in the very midst of the gold-bearing quartz veins, if the pebbles really were mechanically detached pieces of the same quartz. Upon the whole, the views I had entertained in California were confirmed by what I witnessed at Bendigo, and my experience was materially enlarged. The proximity of the placer deposits to the auriferous quartz veins, as well as their obvious connexion with them and the probable derivation of both from the same source, were phenomena and inquiries which presented themselves to me, perhaps more forcibly at Bendigo than at any other gold-field which I had previously known. In my former speculations I might have attributed too little importance to the auriferous quartz veins as a phenomenon which sometimes accompanied the presence of gold in placer deposits. But here the unity of the question forced itself upon consideration.

Gold-diggers are generally the most restless of mortals, and no sooner had my American acquaintances entered upon a successful career at Bendigo than a rumour came that still richer gold-diggings had been found on the "Ovens River," about two hundred miles further towards Sydney. The greater part of them at once took the migration mania, and started thither. I did not go with them. One party of three, after just reaching the Ovens River diggings, were so dissatisfied with appearances that they returned to Bendigo, leaving their companions at the new diggings, where they permanently remained. Those who returned brought me the satisfactory account that Mr Hargraves had appeared at the Ovens, and would arrive at Bendigo on the same day as themselves. This was on a Saturday. I went at once to the Gold Commissioner's camp, and had the gratification of again meeting Mr Hargraves, after a separation of nearly two years. We had too much to say to each other to be gone through in the resident Commissioner's tent, so it was arranged that I should go to sleep at Mr Hargraves's camp, under guidance of his trooper, where he (Mr Hargraves) would join me very early on the following morning, so that we should have an entire day to ourselves to compare notes and communicate confidentially. Mr Hargraves lent me his horse for this purpose, which his servant or orderly brought to him again early on the following morning, and a young gentleman travelling with Mr Hargraves was directed to receive me at the encampment.

Mr Hargraves was now travelling officially as Crown Commissioner for Exploration of the Gold-fields. His outfit consisted of a covered cart drawn by two horses, an extra saddle horse, a tent to sleep in, and the services of two men in the uniform of border police. When in camp one of the men remained in charge of the property, and the other acted as a mounted orderly to Mr Hargraves. The duty of exploration seemed to consist in visiting gold-diggings already established, rather than in searching for new gold-fields. The expedition was evidently merely a tour of pleasure for Mr Hargraves to see the famous gold-fields of Victoria at the expense of the Government of New South Wales, with the possibility that the advantage of comparison might prove of public service.

When Mr Hargraves returned to the camp, we first indulged in some jocularity at his having been appointed Commissioner for Exploration, an occupation for which he was so little qualified, either by inclination for prospecting or by geological tastes, instead of his having been appointed a Commissioner for issuing licences and otherwise administering in the management of the gold-fields, as we had anticipated when the matter was under consideration in California. He explained this anomaly by stating that when Mr Hardy was appointed Chief Gold Commissioner, at a salary of 1,000*l.* a-year, immediately after he (Mr Hargraves) had made the gold discovery known to the Colonial Secretary, he (Mr Hargraves) had energetically protested against the unjust preference as regarded himself, and had refused to accept any inferior and subordinate appointment; therefore a new office had to be made purposely for him, entirely independent of Mr Hardy, and he had then been induced to accept his present Commissionership.

But if I felt any astonishment at Mr Hargraves having undertaken to "explore," I experienced no less amazement to learn that his explorations had apparently given the authorities every satisfaction, for he submitted the three following letters in manuscript to my perusal—Sir H. Young being at this time Lieutenant-Governor of South Australia, and Mr La Trobe of Victoria.

Colonial Secretary's Office,
Sydney, 16th September, 1852.

SIR,—I do myself the honour, by driection of His Excellency the Governor-General, to annex for your information a copy of a communication from the Colonial Secretary at Adelaide, by which it will be perceived that the Lieutenant-Governor of South Australia is desirous that you should visit that colony.

I have the honour to be, &c.
E. DEAS THOMSON.

E. H. Hargraves, Esq., Commissioner of Crown Lands.

South Australia, Colonial Secretary's Office,
Adelaide, August 20th, 1852.

SIR,—I have the honour to enclose copy of a note addressed by Sir H. E. T. Young to Lieutenant-Governor La Trobe, and I am directed to request that you will be good enough to submit it to his Excellency the Governor-in-Chief, in order that the substance of it may be communicated to Mr Hargraves, if he has not yet left New South Wales.

I have, &c.
R. T. FINNISS, Colonial Secretary.

The Hon. the Colonial Secretary, New South Wales.

Adelaide, August 20th, 1852.

MY DEAR SIR,—It is reported here that Mr Hargraves, the first discoverer of gold in New South Wales, is about to repair to Melbourne *en route* to England. In this event, I shall feel much obliged by your making known to him my request that, prior to his final departure, he would visit this colony. Pray assure him that I shall esteem it an important service rendered to the Government and the public of Australia, if he will give himself the opportunity of completing his extensive researches in Australia, by personally inquiring into the existence or non-existence of a profitable gold-field in this part of the continent. I feel confident of the readiness of the Legislature to provide remuneration for the cost and trouble of Mr Hargraves's travels in this colony; —nor can I doubt that her Majesty's Government would regard with great interest any account of this province emanating from one whose success in New South Wales has been productive of such an immense increase to the exports of the colony.

I have, &c.
H. E. T. YOUNG.

His Excellency Lieutenant-Governor La Trobe.

Commenting on these official communications, Mr Hargraves informed me that he did not intend to go to South Australia, since many experienced gold-diggers had already been prospecting over that colony, and, not having found any gold-fields of value, he should, as he thought, diminish his reputation by going upon an exploration which he foresaw would be unsuccessful.

Now here was a fair opportunity for Mr Hargraves, since he declined to go to South Australia himself, at least to offer for my acceptance that Commissionership which he had so boastfully promised to procure when the power of his ever being in a position to do so was uncertain. Nothing seemed easier than for Mr Hargraves to have said on this occasion that the Government of South Australia evidently wanted some experienced person for a Gold Commissioner, and that he would, in reply to the above solicitations, recommend me to Governor Young's notice as being a person more experienced than himself in the examination of gold-fields. Not only must Mr Hargraves at this time have possessed in his own mind the recollection of our verbal agreement to this effect in California, but my written letter sent by my brother, reminding him of the promise, had lately been of great service, as I subsequently learnt, in establishing him as the recognised gold discoverer, and of securing him the appointment which he then held. A number of Gold Commissioners were shortly afterwards employed to examine South Australia, all of whom were quite inexperienced men. But at this confabulation near Bendigo I particularly noted that Mr Hargraves evaded any direct allusion to that appointment, but most particularly enjoined me to meet him in Sydney, at an intended grand celebration of the anniversary of his gold discovery, on the 12th of February, and then to visit with him the locality, after which he would fulfil his pledges, and efficiently serve me in any way that I desired. Mr Hargraves spoke at this time of an intended money grant for his services, and mentioned the sum of ten thousand pounds, but with an air which led me to suppose that he considered the sum too extravagant ever to be granted to him.

I engaged with Mr Hargraves to meet him at the Banquet in Sydney, and for the present returned to Bendigo with my new friend Mr C——, the young gentleman who had travelled from Sydney with Mr Hargraves, and whom I now took under my care to instruct in the art of gold-mining. On the following day I received a note of invitation to dine at the Resident Chief Commissioner's, where I met Mr Hargraves and all the official dignitaries of the district. Mr C——'s refined notion of a gold-miner's requisites had induced him to bring a black dress coat to Bendigo, which I borrowed for this occasion. I had objected to admit Mr C——, an inexperienced young man (who has since been called to the bar), upon equal terms with myself in gold-mining; but another young man, the nephew of Capt. Bull, the Chief Gold Commissioner at Bendigo, being in want of an associate, I proposed to them that the two tyros should work together, and that I should afford them the benefit of my experience, instruction, and advice. They entered into this arrangement, and jointly occupied my tent for awhile, and afterwards encamped near me, convenient to the first White Hill, where I assisted them in selecting claims, and instructed them in the method of working.

I left Bendigo near the appointed day to go to Sydney, with the elated feelings of one who had been invited to participate in public honours, and to be indirectly rewarded for the successful denouement of that discovery towards which I had so much contributed. I now found that all my squatting friends of former days had realised princely fortunes by the great and sudden rise in the negotiable value of their runs and live stock consequent upon the gold developments, and that they, by thus remaining at home, had literally got wealth thrust upon them, without any effort of their own. It is no exaggeration to say that my own late cattle and station on the McIntyre, with the natural increase of numbers, would in ordinary course now have been saleable for at least thirty thousand pounds, so that I had the mortification of feeling that my own efforts and services in the gold discovery had been hitherto far less profitable to myself than if I had drowsily and boorishly lived on the cattle-station until the golden treasures of Australia might possibly have been discovered by some other means.

My proceedings after this time will be found interpolated in the body of the volume, but it may be well now briefly to state that after going with Mr Hargraves at my own expense over the gold-fields of the Western Districts of New South Wales, and examining the spot where he found the first gold, also inspecting the exact place on Louisa Creek where, shortly afterwards, a black fellow found the hundred pounds' weight of gold in one lump exposed to daylight in a quartz veinstone, and likewise visiting Ophir, the Turon, Tambaroora, the Meroo, &c., stopping on each occasion at the quarters of the local Gold Commissioners, I returned again to reside awhile in Sydney.

The monster nugget found in quartz matrix on Louisa Creek by Dr Ker's black fellow in 1851, was at the time the most ponderous piece of the precious metal which had ever been obtained in any country. The largest lump of gold either of the placer-deposit or of the quartz-matrix kind which, previous to the Australian gold searchings, had been found in the world, weighed only ninety pounds, and had been disclosed in the alluvia of the Russian gold deposits. I believe that none of the nuggets at any time found in California equalled this weight. Since the finding of the huge lump by the black fellow on Louisa Creek, several other monster nuggets of still greater dimensions have been discovered in Australia, the largest ever yet found being "The Welcome Nugget," of the weight of one hundred and eighty pounds troy, and of the value of about eight thousand pounds sterling. This valuable prize—the King of the monster nuggets—is the noblest specimen of placer-deposit gold ever yet discovered, and was dug from beneath the drift, at a depth of about a hundred and fifty feet, on the 11th of June, 1858, in the very rich placer-deposits of Ballarat—a gold-field which, from its prodigious productiveness, has been justly styled "The Queen of the Gold-diggings." The normal condition of placer-deposit gold is, however, that of small grains. These monster nuggets and the flour-fine dust may be regarded as equally exceptional and abnormal conditions, and the mere size of the metallic grains gives no certain indication of the richness of any gold-field.

I now frequently met Mr Hargraves, and through his introduction had more than one interview with the Colonial Secretary, Mr Deas Thomson, when conducting his (Mr Hargraves's) affairs through the Legislature. This high State functionary had, however, no ear for any other claim than that of his protegé, and soon afterwards successfully carried in the Legislative Council his own motion for an increased money grant to my late associate. During the delay consequent on these Parliamentary proceedings Mr Hargraves took a voyage to New Zealand, and although he urgently invited me to accompany him thither, I did not feel justified in incurring at my own charges so many expenses of travel without any definite object other than expectation of the fulfilment of vague and delusive promises of nomination to official appointment. Instead of going to New Zealand, therefore, I went alone to examine the celebrated quartz vein near Wellington, where the shepherd, so often mentioned of late years, had long ago gathered his gold specimens in New South Wales. The locality is situate about two hundred miles directly westward from Sydney. Finding the veinstone on examination to be much stronger and more promising for permanent yield of gold than I had been led to suppose from previous information, and learning that it yet remained unappropriated, I applied to the Government for a grant of lease of it. The veinstone was accordingly ceded to me by Governor-General Sir Charles Fitzroy. Some further account of the grant is detailed in the latter portion of this book. A small gold-field had by this time been found in New Zealand at Coromandel Harbour, near Auckland, in the Northern Island, yet Mr Hargraves, it afterwards appeared, did not on this occasion pay a visit to it, but procured through other persons some samples of gold from the locality, one of which he presented to me. The specimens are exceedingly remarkable in kind, but the one given to me, of the intrinsic value of about a shilling, is, perhaps, more remarkable as being the only present of any sort which I ever received from Mr Hargraves, while, on my return from California, I had given to him quite a number of curiosities in gold, some of which were presented to the local Government, and others disposed of by him to jewellers and curiosity dealers in Sydney.

I rode up once again with a friend, some time afterwards, to the Western Gold-fields, first to the township of Mudgee, and thence to examine a second time the Great Nugget Vein on Louisa Creek. I took the opportunity of visiting the diggings at the Devil's Hole and at the World's End. This tour was my last appearance upon any auriferous district. I had never at any time dreamt of following the occupation of an operative gold-digger in New South Wales; indeed it would have been the height of folly for an experienced gold-miner as I was to have left the extremely rich gold deposits in Victoria to dig upon the reputedly poorer gold-fields of New South Wales, for the sake of the gold which could be obtained with the labour of my own hands. I had returned to the colony with very different intentions. The social status of gold-diggers had besides always been low in New South Wales, and as Mr Hargraves had pointedly told me during our ride over the Western Gold-fields the gold-diggers were included in the Vagrant Act, and "having no known and usual place of abode, were held and deemed to be Rogues and Vagabonds, and might be treated accordingly." This degradation by Statute Law was in striking contrast to the high social and political position of gold-diggers in California, and would alone have deterred me from the pursuit in a land where my former associates, the Squatters (who as a class had always been patrician in their pretensions), had now not only become immensely wealthy, but were shortly expected to be numerously included in an "Order of Hereditary Nobility," which a committee of the Legislature had in a recent printed document gravely recommended as the result of their inquiries into a proposed new Constitution for the colony of New South Wales.

Mr Hargraves and Mr Deas Thomson proceeded to England nearly at the same time, and to the former, before his departure, I wrote two letters on a theory of the origin of gold-deposits upon the sole condition that it should at once be printed in the local journals. Mr Hargraves, in soliciting the theory, assured me that, "whatever I wrote he would adopt, and whatever he adopted would in England be accepted as Gospel truth," since he had not only the protection and patronage of the Colonial Secretary, but also an introduction and credentials to the Imperial Government. Some of my other public letters appeared during their absence. Both Mr Hargraves and Mr Thomson returned to the colony, after remaining in Europe about two years. A dinner with the Duke of Newcastle, a presentation to Her Majesty, and an election to Membership of the Geological Society, were among the English honours accorded to my late associate through this introduction. A new political constitution had in the mean time been established in New South Wales, and government by a responsible ministry introduced, when the lately irresponsible Colonial Secretary retired from official life upon a very liberal pension.

Mr Hargraves had repeatedly solicited me in the colony to write a book for him, which on the ground of inaptitude at literary performances I had invariably declined to do; he also more than once had proposed my accompanying him to England and the continent of Europe, even offering to pay my travelling expenses if I chose to go with him. But I objected to do so, for I could not consent to become merely the parasitical companion of "The gold discoverer," while I felt a keen sense of the injustice which had been done to me by the late government, in totally ignoring the services which I had rendered towards achieving that discovery. I soon had occasion to rejoice that I did not proceed to England with my former companion, when shortly afterwards some effusions of the English newspapers, apparently sanctioned by him, reached New South Wales. Another publication also appeared in England as a book by Mr Hargraves, and although the true author of the greater part of it (who resided in the colony, and has since held high position as a public functionary), was well known to me, yet I did not suppose that my own claims would have been so utterly ignored in the book as they are, nor did I anticipate that the theory which I had written especially for Mr Hargraves's service would have been so complacently plagiarized and appropriated so far as it appears to have been approved of or understood.

Reserving conclusive observations on the gold discovery for another part of this volume, I need here only add that a voyage to England being considered desirable for the benefit of impaired health, I engaged a cabin in the homeward-bound clipper ship "Omar Pasha," in which, after a satisfactory passage of eighty-five days *viâ* Cape Horn, my circumnavigation of the globe was completed. I reached my native land, after an absence of fourteen years, in the genial month of September, when the fresh green fields and full foliage on the trees presented a favourable contrast to the brown landscapes and sombre gum trees I had so lately left in Australia, no less than to the gloomy pine forests and rugged mountains I had formerly traversed in the remote mining districts of California.

Part First.

PUBLIC BANQUETS, LETTERS, AND COUNCIL PAPERS.

THE public entertainments in honour of the gold discovery, and of Mr Hargraves as the popular gold discoverer, with the public correspondence resulting from them, and the Council papers of the Legislatures of New South Wales and Victoria, are in this part presented to the reader in the order of their publication in the colonies. These reports in the public prints were first perused by me partly before arrival in Sydney from Victoria, and partly immediately after return with Mr Hargraves (then Crown Commissioner for Exploration) from visiting the Western Districts of New South Wales. It is to be observed of my own silence in the local journals with respect to some of the allegations of my former associate and his friends, that owing to recent arrival I possessed at this time, besides these public statements and such other information of the proceedings as Mr Hargraves himself had supplied to me, but little knowledge of the actual circumstances under which the first placer deposit gold discovery in New South Wales had since our separation in California been realized by him; consequently of many essential facts of the case I yet remained in ignorance; nor was I so fully aware, as became apparent on further investigation, of the important influence which my own previous comparisons and instructions had exercised in the event. My sheep run had, however, in the interim been ascertained to be auriferous, and at Ophir I found that precisely in accordance with my previous observations and conclusions were the conditions under which the placer deposits of gold in Australia had been revealed. The evidence taken by a Committee of the Legislature subsequently to these ovations, and only read long afterwards, finally supplied me with the more exact information. The Minutes will be found in Appendix K.

One of the earlier banquets given in honour of Mr Hargraves and the gold discovery took place at Melbourne in December 1852, and is thus reported in one of the Sydney journals.

On the 3rd instant Mr Hargraves was entertained at a grand déjeûner, the leading gentlemen of the city being present. Mr Westgarth, M.L.C., presided, supported by the Auditor-General and the leading members of the local legislature. Apologies for non-attendance (in which high eulogies upon Mr Hargraves were included) were forwarded by the Lieutenant-Governor and Colonel Vaillant.

* * * * *

Mr Westgarth proposed the toast of the meeting, "The Health of Mr Hargraves, the discoverer of the Australian Gold-fields." The hon. chairman introduced, in his usual lucid manner, some highly interesting statistical information in respect to the Victoria Gold-fields, as will be seen by the following extract from his well-timed and judicious speech:—"When it was considered that only fifteen months had elapsed since the first discovery of gold-fields in the colony—for although they had been discovered some time previously in New South Wales, they could not be said to have been discovered more than fifteen months in Victoria,—and when they considered the progress which had been already made in consequence,—the port crowded with ships, multitudes pouring in from every quarter, and when they considered the immense wealth which had resulted from that discovery in so short a period, they were enabled to predict a glorious future. To use an expression which had become current in the sister colony, they had been precipitated from a colony into a nation. In introducing the illustrious discoverer of gold in the Australian colonies to the assemblage, he might be permitted to make a few observations in reference to that discovery. He had been informed by Mr Hargraves that the momentous day upon which he first made the discovery was the 12th of February 1851, a year ever to be remembered in the history of the Southern Hemisphere. It had been said that Mr Hargraves had discovered the gold-fields of New South Wales, but he had in fact discovered the gold-fields in Australia; and as the colony was pronounced to be the first colony of Australia, they might perhaps live to see the day when it would be the first colony in the British Empire. It was unnecessary to mention the cause of that greatness; it was the gentleman who now appeared before them, and who had been an instrument in the hands of Providence to accomplish that end. They had now met to accord their humble mite of praise and applause to that instrument of Providence. It was unnecessary to enter into any elaborate statement of what had accrued from the discovery of gold, and he was happy to state the discovery of the precious metal was going on increasing. He was aware that it had been rumoured of late that the yield had been falling off; but he was happy in being enabled to state that the reverse was the case. He held in his hand a return compiled by Mr Khull, showing the amount which came down by escort, by which it would be seen that the sums received during the last few weeks were greater than on any previous occasion whatever. During a single week, at the termination of last month, 153,477 ounces had been sent to Melbourne and Geelong, and the amount sent down last week fully bore out the statement which he had just made. Thus it would be seen there was nothing in any way to cast a shade on the glories of the past. He was happy to perceive by the Press of the mother country that it took the same view of the subject as the colonists here did, particularly in reference to the gentleman who had been the instrument of making the great discovery, and that the discovery of gold was regarded as the great means of spreading the Anglo-Saxon race to the furthermost ends of the earth.

Mr Hargraves, in acknowledging the toast, recapitulated the history of his labours since he first, in California, entertained the belief that gold was to be found in the Australian colonies.

While being thus fêted in Victoria, two leading members of Council in New South Wales had in debate spoken of Mr Hargraves so disparagingly as to call forth the two following public letters,—one from "A Friend," and the other an indignant epistle from Mr Hargraves himself, of the same general tenor with his address in Melbourne.

The letter of apology from "A Friend," addressed to the Editor of the Herald, being as follows :—

Gentlemen,—I have read with much surprise and more pain the report, in your issue of this morning, of yesterday's proceedings in the Legislative Council. I allude to the apparently uncalled for and virulent attack on Mr Hargraves, made by Mr Wentworth and Mr M'Leay. The former of these gentlemen is reported to have said that Mr Hargraves "is a very shallow and impudent person;" the latter that "it is generally believed now that Mr Hargraves is an impostor." Very hard words these! But the truth will not be elicited by a retort in the like tone and temper. Will you, therefore, allow me, as a confessed admirer of Mr Hargraves's character, both public and private, to lay before the public, through the medium of your columns, a plain statement of facts, with a few inferences fairly deducible from them.

Many large tracts of land, in which gold is now found in abundance, had been a few years ago traversed with the express object of exploring (though not perhaps for gold) by men of great scientific knowledge and experience, especially by Sir Thomas Mitchell and Mr Clarke. That gold must exist in these regions had been long declared by the most eminent European geologists. Much of the land had become private property—some of it the property of Mr Wentworth himself; yet the explorers, with all their science, and though encouraged by the declared belief of the existence of gold, made known by men more eminent than themselves, fail to discover the precious metal. Nor do the owners of the lands think it worth their while to spend time or money in what they doubtless formerly deemed an idle chimerical search. All of a sudden there comes forward a gentleman, who has been some time engaged in digging for gold in another country, and says, "From what I have seen and learnt in California, I am convinced that there must be vast treasures of gold in New South Wales. I have no scientific knowledge of Geology,—I am not even acquainted with the hard multifarious terms used in that science; but the operations of Nature are uniform, and I form the conclusion I do from the evidence of my senses and the obvious deductions of reason. The formation of the land in New South Wales (whose scientific description I cannot give) is to all appearance identical with that in California; therefore, in that faith,—in the faith of the uniformity of the operations of Nature,—I will abandon my employment here, and prosecute my search for gold in New South Wales."

Under such circumstances Mr Hargraves returned to this country, made known his belief and his views to the Colonial Government, and after having with difficulty obtained slight aid from that Government, for the prosecution of his researches, he very shortly made that discovery which has since astounded the whole civilised world. The fact cannot be denied that Mr Hargraves did return hither from California for the above purpose, that he did declare that purpose to the Government, and that he did first discover that this country contained gold-fields of sufficient richness to repay the cost of working.

I believe that before Mr Hargraves made, or made known, his discoveries, he had received an assurance from the Colonial Government that in case his researches were successful he should be rewarded in a measure adequate to the result. I do not of course pretend to give the precise terms of the Government pledge, but no one can doubt what in such a case would be the spirit of such a compact. But what have been the results?—results which followed immediately in the very wake of Mr Hargraves's discoveries. First, the Transportation question, which was being hardly contested with the aid of the subscribed thousands of our wealthy merchants and settlers, was instantly set at rest. Secondly, a degree of prosperity hitherto unknown in any country of the world! Thirdly, a stimulus given to emigration, which we were in vain imploring the Home Government to accelerate. These are among the most prominent results—enough for the present purpose. And what sum would have been thought too large, what honour too great for the man who, three years since, could have assured us of all these blessings in so short a time? I do not say that Mr Hargraves is entitled to the praise of all these consequences; they are the natural developments of human society in the position in which this country has been placed—still they are the consequences of that sole discovery.

But Mr Hargraves is "a very shallow and impudent person!" These words surely come with a very ill grace from a gentleman who, possessing, amongst other landed estates, one of very trifling market value, finds it in a moment worth 25,000*l.*, and a considerable reserve of profit besides; and this the direct and almost immediate result of this "shallow person's" discoveries. This is a reward with a vengeance. Great as my admiration for Mr Wentworth is—and I do think him the greatest man that this country has given birth to—I cannot but deplore his use of such terms to such a man, to one from whose enterprise he is reaping so great advantages.

But, says Mr M'Leay, "It is generally believed now that Mr Hargraves is an impostor." What is an impostor, pray? Johnson says he is "one who cheats by a fictitious character." Worcester says he is "one who is guilty of imposition, one who pretends to be what he is not—a fictitious character—a false pretender—a deceiver." Now will any man breathing dare to say that any one of these definitions is applicable to Mr Hargraves? What, then, is the conclusion? Only that Mr M'Leay is ignorant of the meaning of his own language, and that ignorance has given birth to its usual progeny—insolence.

Gentlemen, in the performance of what you deem to be your duty as public journalists, you have given a world-wide circulation to an unprovoked attack on a gentleman whose services to the public, most who are acquainted with them think great. In doing so you have given pain to many of that gentleman's friends, and when he sees the report it cannot fail to wound him deeply; for, however conscious he may be of his own rectitude, however humbly he may think of his own scientific acquirements (and no one can estimate them at a lower rate than he does himself), still it is not in the nature of things that he can quietly submit to be publicly branded as "a shallow and impudent person," and "an impostor." I therefore do trust that, however much space this defence of Mr Hargraves may occupy in your columns, you will, in that gentleman's absence, give it early insertion, both that the public may hear the other side, and that he may have the consolation of knowing that he has admirers, who are ready to come forward and vindicate his claim to his country's gratitude.

I venture to subscribe myself (though without his permission),

A FRIEND OF MR HARGRAVES.

The other public letter on this subject, written by Mr Hargraves, and also addressed to the Editors of the same journal, appeared thus:

GENTLEMEN,—As a colonist of upwards of twenty years' standing in this my adopted country, and an honorary subscriber to your widely-circulated journal, I have ventured to ask the favour of an opportunity of replying to a most unprecedented, unmanly, unwarranted, and undignified attack made upon me in the Legislative Assembly during my absence in Victoria on public duty, for the express purpose of visiting the auriferous regions of that country, to see if any new feature in the geological structure of the country would present itself, and thereby enable me to point out other auriferous localities in this country. Having completed my tour in that province, I arrived in the city of Melbourne, not intending to remain there one day; neither of the steamers were in. I accordingly took my passage in the good ship Templar, Captain Brown, with the intention of immediately going on board, when my progress was arrested by the wealthy and influential men of that great city, inviting me to a public breakfast. This expression of public feeling, emanating from so intelligent, so wealthy, so important, so grateful a people, both in word and deed, was received by me with feelings of honest pride. Well, Gentlemen, the breakfast came off on Friday, the 3rd day of December instant, and the 'Melbourne Argus' of the 4th instant (herewith enclosed) which is printed by steam, gave a correct account of this splendid entertainment; and in this, my present communication, I wish you and my fellow-colonists clearly and distinctly to understand that if offence in my speech in returning thanks on this occasion was given, that I now fully confirm it in every particular; but how I could possibly have done so I am at a loss to know. Probably you will inform me? I want to know wherein I have sinned in this instance. The 'Empire' of the 15th instant would infer that offence was given in the 'Argus' of the 9th instant. Now I left Melbourne on the 4th, and have not seen any paper later than that date; consequently no offence could have emanated from me on this occasion. I was, in fact, in Bass's Straits at the time. It is also inferred by the 'Empire' article that I have spoken disparagingly of my Government. Now had I done so I certainly should have been guilty of gross ingratitude, as the Government have ever been kind and considerate towards me, and I am well satisfied with them, and have always expressed myself in these terms; had I wished to have left my Government, the enclosed letter, No. 1, will prove I had an opportunity of doing so, which I declined, unless ordered to go by the Governor-in-Chief; and before I was employed by this Government, Tertius Campbell, Esq., then a resident of Sydney and an opulent merchant, offered me a share of a speculation in gold buying, and I was to have an unlimited amount of capital at my disposal. This offer I refused, and accepted the appointment I have now the honour of holding, thinking it would augment the amount the Home Government would award me for my discovery. The gentleman who accepted the nabob's offer made 10,000*l.* by it in a very short time, and is now a wealthy merchant in the city of Melbourne. Six months ago I refused a bonus of 500*l.*, and 1,000*l.* per annum, from a company, of which fact my Government are cognizant. My contract with the Government is simple; I herewith enclose a copy of it, and would add I have ever had the most implicit confidence in their liberality towards me. I have never in any way, either directly or indirectly, been concerned in gold-mining, gold claims, or gold companies in this country: neither have I made, nor attempted to make, one single farthing by my discovery, except from the Government, on whom I have relied and to whom I have given my services; and now at the eleventh hour, when the battle has been won, and I have ever been in the forefront, am I to be handed over to the tender mercies of Messrs Wentworth and M'Leay, who, forgetting the dignity of their position as senators, choose to indulge in scurrilous abuse? The first of whom says—"Mr Hargraves is a shallow and impudent person;" and the latter "that Mr Hargraves, it was now generally believed, was an impostor, and the sooner the connexion with him and the Government was cut the better." I do not consider that the opinions of two members of the Senate is of much importance under any circumstances: I never before even heard of Mr M'Leay, and should not know Mr Wentworth were I to see him. I certainly did refuse to take ten shares in the Wentworth Gold Company, which the vendor informed me would qualify me for a directorship, and that I was sure to be elected, and that Mr Wentworth was all-powerful in the Council, and that if my claims should perchance come before that august body, he might be the means of doing me much good, that he was a staunch friend but a bitter enemy. With reference to Mr M'Leay, who has, by virtue of his solemn engagements as a senator, chosen to designate me as an impostor without showing cause, without calling me to the bar of that House, without making any charge, without giving me an opportunity of vindicating myself as every felon has,—but under the cloak of privilege to make use of language cowardly, undignified, unmanly, ungentlemanly, and most thoroughly contemptible to every right-minded and honest man,—such a pitiable creature as this should be passed with silent contempt. This, indeed, would have been the proper and dignified way of treating such a person, and consistent with the high position I have gained by the exercise of my scientific skill and knowledge in the discovery and practical development of the Australian gold-fields; but as we are daily and hourly receiving a great access of population, many of these worthy emigrants whom the name of Hargraves has brought from the four quarters of the globe will naturally say, why this Hargraves is designated as an impostor in the Senate and takes no notice of it!—who is he, and what is he? or what is the cause of all this? I therefore am compelled, although reluctantly, to say who I am and what I am. Had such a scurrilous attack been made any where else I certainly should never have condescended to notice it. But emanating from members of Council it behoves me to do so, and I shall be as brief as possible, and leave you and the public to judge how far I am deserving the name of an impostor. Well, Gentlemen, I am the son of a British officer, born on the march, when Napoleon Bonaparte was convulsing all Europe. In those days, Gentlemen, every man was girding up his loins in defence of his country—shield and buckler was then the watchword of the day. That was a time of tribulation for England, until the great Wellington delivered his country. Now, Gentlemen, every man also girds up his loins and goes to the field. but not to the battle-field with his sword to slay his fellow-man. No, Gentlemen, to the gold-field with his pickaxe. War is now no more, we are cultivating the arts of peace. I have before told you I am a resident of upwards of twenty years in this country, and my pretentions are that I am a sane person, possessing an average amount of common sense in common with my fellow-men, nothing more nor nothing less; and that some seventeen years ago, I resided a short time near Bathurst (this is known by G. Rankin, Esq., J.P.) and during that time I was once only over Summer Hill, Lewis Ponds, and Emu Creeks. I had some slight knowledge of rocks, and was at that time very forcibly impressed with the structure of the country, but never thought about gold. However, California in process of time sprung up, and being of strong constitution and having nothing to lose, I considered myself a fit and proper person for a gold-field; I could not possibly lose anything, and I might gain: in fine, I was an adventurer to the California gold-fields. And on my arrival there I saw the same class of rocks which I had seen in the Bathurst country. I at once began to reflect, and it occurred to me that the same class of rocks which produced gold in one country would do so in another, and I at once spoke my feeling on the subject to my partner and friend, Simpson Davison, Esq., who is now at Bendigo. Mr Mort, of this city, is cognizant of this fact; I then wrote to Samuel Peek, Esq., J.P., on the subject, distinctly mentioning my belief of the auriferous character of New South Wales. This and another letter posted at San Francisco, both on the subject, are now in the city of Sydney, and have been seen by hundreds—Mr Mort, Mr Hale, Mr Parkes, and many citizens. I still worked away at mining in California successfully, and very many times told my friend Davison that he would come over to my diggings in New South Wales. I then expected every ship would bring the news of the discovery; however no such tidings reached us, and in the fall of 1850, just as the snow was about to commence, I made up my mind to return to Sydney, and wished Mr Davison to come also, assuring him that I would point out a gold-field near Bathurst. His answer was, I am in a gold-field: go you and find your gold-field in New South Wales, and then I will come to it. I accordingly came to San Francisco and took my passage in the barque Emma, Captain Arthur Devlin, a native of the colony, who with Joseph Walford, Esq., was the owner of the ship, and in the bay of San Francisco, on board the barque Emma, I reiterated my previously expressed opinions, and boldly stated the object of my voyage, to the great amusement of the Captain in particular, who frequently got up a joke at my expense as the "Hargraves' gold-hunting freak," as he was pleased jocosely to call it. I was lodging a few days at Mr Underwood's establishment, where I entertained some of my American friends at a dinner there, again, before I went on board the ship. I asserted my belief in the auriferous wealth of New South Wales. Mr Davison was present. I also, in a conversation with William Abercrombie, Esq., on that day, expressed the same opinions (Mr Abercrombie is now in Melbourne, his address is Brasnell's Hotel, Lonsdale street). Well, Gentlemen, I arrived in Sydney on the 7th of January, 1851, and went first to see my friend Mr Peek, who laughed amazingly at my crotchet, as he was pleased to call it, and said very many funny things; and when I told him seriously that I was fully determined to carry out my project under any circumstances he said—"Well, Hargraves, if you are such a fool as to lose your time in running about the country where the geologists of France, Russia, and Britain have been over to look for gold, depend upon it you will certainly fail, and be laughed at in the bargain, and you will gain the reputation of a madman." James Norton, Esq., solicitor, followed in the same strain, but not so good-humouredly. He said, after I had given my opinions—"Well, Sir, you are a fool, I always thought so, and now I am sure of it; but I will give you a letter to my friend Icely, who does occasionally get a speck or two of gold in quartz, and no doubt you will agree very well in your golden ideas." This was glorious news to me to hear of a speck or two of gold in quartz. My object was to get away immediately. I thought every person must see with my eyes. I had visited my friend William Spain, Esq., the Inspector-General of Police, and expressed my opinions to him; he had no hesitation in pronouncing it a wild and unprofitable undertaking, and endeavoured to deter me in a kindly and sincere manner. I dined that day with the former, and there met Mr Clarke, the City Surveyor, and Mr Bryant, wine and spirit merchant. These gentlemen also differed widely with me on the subject of my intended tour. I might mention scores of other persons of standing in the colony, but think enough has been written to prove my case thus far, notwithstanding I am defending myself from the grave charge of being an impostor.

You will now consider me, alone and unaccompanied, to the westward of Bathurst, early in February, where I met Mr Icely, then on his way to Sydney on business of the most important nature. I told him there was no doubt about a gold-field existing in the neighbourhood, and in all probability I should make the discovery in less than twenty-four hours, and that I would write to him. In less than thirty-six hours I did make it, and wrote to Mr Icely (private and confidential), informing him of the fact, stating I was convinced of seventy miles of country being auriferous. I took the son of my late respected friend Captain John Lister with me as a guide, not having been there for seventeen years; fences had been erected, and I had not sufficient knowledge of the country to trust myself too far. I told him in confidence, and pledged him to secrecy, what I came for, and on the 12th day of February, 1851, we started to Lewis Ponds. I was full of hope, I had come ten thousand miles across the ocean cherishing the thought in my bosom, and the reader may easily imagine what my feelings were when I saw my old rocks again that had cost me so many anxious thoughts. I was full of joy; and coming to a waterhole where I could wash (water being very scarce at that time), I said to my friend's son, "Now we will stop here." The horses being hobbled out, and some refreshment partaken of, I said there is gold where you walked over to get the water, and now I will find it. A schistose dyke ran across the creek at right angles, and with my own hands I dug with a trowel a pan of earth, which when washed produced one grain of gold, the second one, third one, fourth one, fifth nil, sixth one. I said, this is a memorable day in the history of New South Wales. My time was then busily occupied in intersecting the country to see to what extent the field was likely to be. I went alone to Wellington, and thence to Dubbo, where I again found gold, and got, through the kindness of Mr Cruikshank, a black fellow to show me the country about Mitchell's Creek. On my return to Guyong, I purposed making a tour to the Macquarie, and at the earnest solicitation of Mr Lister took a young man by the name of James Tom, whom he said knew that part of the country well. After my return from this journey I was fully satisfied, and returned to Sydney and explained the whole matter to the Colonial Secretary, and after several interviews he requested me to communicate my ideas in writing, as the Government were not prepared to credit it. I did so, and the following letter (No. 2) will show fully the nature of my engagement; and on the very day that I received the Colonial Secretary's letter (No. 3), I received a second letter from Mr Lister, informing me of their progress. I, having instructed Mr William Tom to make a cradle, and given full instructions how to use it, previous to my leaving Guyong, then pointed out the gold-field to Mr Stutchbury, the Government Geologist; and it will be utterly useless for me to go on pointing out the immense benefits the colony has reaped by the discovery, or what it is likely to do. This will occupy much greater space than you could spare me in your journal, but will occupy a chapter in my contemplated work on New South Wales, to be entitled 'Hargraves' Twenty Years in Australia.' My travels in New Zealand and California will be embodied in it also. Now, Gentlemen, I leave my case in your hands and those of my fellow-colonists, and ask you and them how far Mr Wentworth and Mr M'Leay are justified in the cowardly and vindictive attacks they have made on me in the Assembly during my absence; and whether it would not have been a more manly way to have stated specific charges, and then called on me to answer them at the bar of that House, in lieu of the course pursued by them in denouncing me as an "Impostor" under the shield of their privilege as senators? Is this fit treatment for a public officer? Is it just? Is it manly? Is it in keeping with the age of progress in which we live? It may be natural to Mr Wentworth. I believe he is an enemy to progress, and, if my recollection is good, he opposed the railways, on the ground of working-bullocks and pole drays, travelling eight miles a-day, being the natural conveyances of the country. This will afford me a good subject for a chapter in my contemplated work. The natural inference in England would be that the hon. member was 300 years old to talk such arrant nonsense in the fifty-third year of the nineteenth century. I now leave these hon. and privileged calumniators, as I have said before, in your hands, and those of the public, to deal with them according to equity and good conscience.

You will please reserve for me one hundred copies of your journal, containing this letter, in order that I may send it to every part of the globe where the English language is spoken, and thus introduce Messrs Wentworth and M'Leay to the world at large as two antipodean legislators of the 19th century, whose eyes are evil, because a great and wealthy people to the South have appreciated my services not only in word but in deed; and to this people I shall ever feel a deep debt of gratitude, and in every country and every place wheresoever I go, I will drink their health and prosperity in vessels of gold, while Mr M'Leay will be in the mountains wool gathering, and drinking out of an old bullock's horn, which Mr Wentworth will of course say is a natural vessel, and more suitable to the colony; and while working bullocks and pole drays is the Wentworth motto, mine will ever be Steam and Progress. I am, &c.,

EDWARD HAMMOND HARGRAVES,
Crown Lands Commissioner.

December, 1852.

APPENDIX TO THE ABOVE.

No. 1, the letter here alluded to, is the one from Lieutenant-Governor Young, printed at page 71.

No. 2.

Copy of a Letter from Mr E. H. Hargraves to the Colonial Secretary.

Sydney, 3rd April, 1851.

SIR,—With reference to my interviews with you regarding the discoveries recently made by me of the existence of gold on Crown lands in the interior of this country, and to your suggestion that I should communicate to you in writing my views in the matter, I beg leave to state that I embarked in the discovery at my own expense, as a speculation, and as a means of bettering my fortunes in the event of my search proving successful. I have succeeded beyond my expectations; and, so far, the great hardships, expenses, and exercise of my skill have been rewarded; and further, that within the period of my explorations (the last two months), I made very satisfactory discoveries of the existence of the precious metal in several localities on the Crown lands above referred to, and that my first discovery was made on the 12th of February last.

I have the honour to submit, for the early consideration of the Government, the following propositions, viz., That if it should please the Government to award to me, in the first instance, the sum of five hundred pounds as a compensation, I would point out the localities to any officer or officers they may appoint, and would undertake to realize to the Government my representations, and would leave it to the generosity of the Government, after the importance of my discoveries and disclosures has been ascertained, to make me an additional reward, commensurate with the benefit likely to accrue to the Government and the country.

Requesting the honour of an early answer, addressed to me, East Gosford, Brisbane Water, I have, &c.,

EDWARD H. HARGRAVES.

To the Hon. the Colonial Secretary.

No. 3.

Copy of a Letter from the Colonial Secretary to Mr E. H. Hargraves.

Colonial Secretary's Office, Sydney, 15th April, 1851.

SIR,—In reply to your letter of the 3rd instant, I am directed by the Governor to inform you that his Excellency cannot say more at present than that the remuneration for the discovery of gold on Crown land, referred to by you, must entirely depend upon its nature and value when made known, and be left to the liberal consideration which the Government would be disposed to give it. I have. &c.,

E. Deas Thomson.

Mr E. H. Hargraves, East Gosford, Brisbane Water.

After these two letters, appeared the following semi-official leader in the 'Sydney Morning Herald' of the 31st December, 1852, headed Is Mr Hargraves an Impostor?

While we do not for a moment question the right of honourable members, in the discharge of their senatorial duties, to the most perfect freedom of speech, we must not forget that even in their case there is a limit beyond which liberty degenerates into licentiousness. Nor must we lose sight of the fact, that in proportion to the value of Parliamentary privilege is the culpability of its wanton abuse. An instance occurred a few days ago in our own Legislative Assembly, in which we think this privilege was carried beyond the bounds of reason and propriety—beyond the bounds of justice and of truth; and against which, therefore, as public journalists, we feel it to be our duty to protest.

We refer to the observations advanced in the Committee of Supply, on the 15th instant, with regard to the gentleman to whom these colonies are indebted for the most important discovery ever made in them since their foundation. In discussing the question of appropriating a thousand pounds for the exploration of our gold-fields, one honourable member thought proper to speak of Mr Hargraves as "a very shallow and impudent person;" while another hazarded the still more sweeping assertion that "it was generally believed now that Mr Hargraves was an impostor."

Whether the first of these imputations was true or false, it is not necessary for us to enquire. True or false, it amounts to nothing. A man may be shallow, which is a misfortune rather than a fault, and he may be impudent, which is a fault and not a misfortune, and yet do good service to the State. The question before the Committee was not whether Mr Hargraves was a profound philosopher and an accomplished gentleman, but whether he had a claim upon the colony as the discoverer of its gold-fields. If it could not be denied that in point of fact the discovery had been made by him, and that in point of justice he had thereby entitled himself to the liberal consideration of the Government and the House, to say that he was shallow and impudent was mere impertinence. It did not touch the merits of the case at all, and could have no effect but that of giving wanton and gratuitous offence, not to Mr Hargraves alone, but to all lovers of fair play between man and man.

The other charge was one of a very different kind. It not only *touched* the merits of the case, but, if true, swept them clean away. If Mr Hargraves was verily an "impostor," not only had he no claim to any part of the money-vote then under discussion, but he had cheated the Government of every farthing he had already received out of the Treasury, and the Law Officers were bound to prosecute him for having obtained money under false pretences.

But what are the facts? Setting aside the detailed statements contained in Mr Hargraves' letter, published in our Supplement of the

22nd instant,—although we are bound to admit that those statements bear the impress of sincerity and truth,—we appeal to the records of the whole Colonial Press during the last nineteen months, and to the knowledge of all persons who have resided here during that interval, as sufficient proof that, whatever else he may be, Mr Hargraves is no impostor. He has proved what he said, he has done what he professed. He made an assertion so startling, that the colonists refused to believe it, and his friends laughed at him as a fool. He declared that Australia abounded with indigenous gold; and several millions worth of the precious ore has already been exported from her shores. He ascribed to these colonies a character which, however incredible at first, is now the object of the world's belief and of the world's admiration, and is attracting population by thousands, and capital by millions. He has been the means of doing that which the lips of one of his very calumniators have said will precipitate the land from a colony into a nation. And this is an "impostor!"

But Mr Hargraves can appeal to something more formal than the testimony of newspapers, and more definite than popular tradition. He can appeal to official documents laid upon the table of the Legislative Council by the Colonial Government, and "presented to both Houses of Parliament by command of Her Majesty." And he can there point to chapter and verse, to dates, names, and all particulars, in refutation of the monstrous slander. Into these particulars we need not enter, but it is only just to the calumniated author of our great discovery that we should bring prominently before our readers the conclusions arrived at, with reference to this case, by the Executive Council of New South Wales. At a meeting of this honourable body, held on the 3rd June, 1851, several documents were laid before the Council by His Excellency the Governor-General; whereupon the following Minute was adopted:—

"These papers having been read, His Excellency the Governor consults the Council as to the immediate remuneration to be given to Mr Hargraves, and as to his official employment in the further prosecution of searches for gold-fields which can be immediately worked, this being now an object of great importance, in order to prevent disorder amongst the persons flocking to the mines, owing to the limited extent of the spot to which the digging is now confined.

"The Council, after full consideration of this matter, advise that a payment of five hundred pounds should be at once made to Mr Hargraves, with an intimation that such additional remuneration as upon further information as to the extent of the gold-field may be considered due to him, with reference to the value of his discovery, will be left to the decision of Her Majesty's Government.

"The Council further advise that Mr Hargraves should be temporarily appointed a Commissioner of Crown Lands for the express purpose of continuing to search, on behalf of the Government, for further fields of employment for the gold-diggers, and that he should receive during the term of his appointment a salary at the rate of one pound a day, with a daily forage allowance of two shillings and sixpence each for two horses.

"Mr Hargraves, being in attendance, is then called in; and having given the Council information respecting the gold-field already discovered by him, and the prospects of further discoveries of gold over a vast extent of country which he anticipates, he is informed of the remuneration proposed to be given to him as above recorded, and of the appointment which it is intended that he should receive."

Now, the gentleman whose claim as the discoverer of our gold is thus solemnly recognised by the Executive Government is the very individual whom a member of the legislature has openly branded as an "impostor!" The question at the head of this article has received its answer.

The Executive Government having accepted Mr Hargraves as *the Gold-Discoverer*, and admitted the date of the twelfth of February, 1851, as the time of the true discovery, a public banquet in Sydney to honour the event was duly arranged for the second anniversary. It was my intention to have been present at this dinner by especial desire of Mr Hargraves, and I had left Bendigo in order to be in Sydney on the occasion, intending immediately afterwards to accompany my late associate over the gold-fields of New South Wales. But no steamer being in Melbourne on my arrival there, it was compulsory to take passage in a sailing craft, which, meeting unfortunately with adverse winds, did not reach the desired port until the affair was over. From reading Mr Mort's speech, however, I learnt that an important letter of mine from California had been shown to him, and quoted before the Assembly. In this letter I had reminded Mr Hargraves of the understanding that he should promote my advancement so soon as he should have secured the Government recognition of himself as the gold-discoverer. Mr Mort, from motives of delicacy in the presence of his Excellency, had used the word "clerk," well knowing, nevertheless, that "Gold Commissioner" was the office alluded to.

The 'Herald' reported the banquet in the following language:

THE GOLD DISCOVERY ANNIVERSARY DINNER.

The Second Anniversary of the Australian Gold Discovery was celebrated on Saturday (12th Feb. 1853), by a public dinner in the saloon of the Royal Hotel. His Excellency the Governor-General, the General Commanding, the Senior Naval Officer, the Colonial Secretary, and several leading members of the Government, received invitations from the stewards, and honoured them with their presence on the auspicious occasion. It had been the intention of the committee of the Hargraves Testimonial to present Mr Hargraves with the golden cup which has been purchased out of the funds subscribed; but most unfortunately the hero of the day was prevented from attending by severe indisposition, and the interesting ceremony of presentation was unavoidably postponed.

A guard of honour of the Eleventh Regiment, and a detachment of mounted troopers, attended in front of the hotel to receive the Governor-General. Shortly after six o'clock his Excellency, attended by his suite, and accompanied by Lieut.-Gen. Wynyard, arrived. Sir Charles was attired in full uniform, and the members of the Executive Council appeared in official costume. The stewards wore a distinguishing badge of white satin, on which were printed the words "Gold Anniversary," in golden characters.

The Governor-General was then conducted to his seat in the banquet-room by the Stewards, and the chair was taken by the Hon. E. Deas Thomson, Colonial Secretary, who was supported on the right by his Excellency Sir Everard Home, the Speaker, Colonel Bloomfield, and the Mayor of Sydney, and on his left by Lieutenant-General Wynyard, Mr Justice Therry, and Deputy Commissary-General Coxworthy. The vice-chair was occupied by Dr Douglass, M.L.C., who was supported on the right by the Colonial Treasurer, and the Postmaster-General, and on the left by the Auditor-General and the Solicitor-General.

About 200 persons sat down to dinner.

The usual loyal toasts having been duly honoured,

The **Chairman** called upon the company once more to fill bumpers. The toast he had now to propose was the health of His Excellency Sir Charles Augustus Fitz Roy, Governor-General of all her Majesty's Australian possessions. It would neither be becoming in him, nor would it be agreeable to the Governor-General himself, in their relative positions, to say all he could wish to say on this occasion. But this he would say, that never was there a Governor of these colonies more anxious or more solicitous to advance their interests in every way in his power, and never was there a Governor who had been more successful in this object.

The **Governor-General** rose to return his sincere thanks for the honour they had done him by the way in which his health had been received. When it was proposed last year to celebrate the anniversary of the gold discovery by a general holiday, he had not given his sanction to the proposal, because considerable doubt then existed in his own mind, and in the minds of many, whether that discovery would lead to good or evil. But he could now fairly say that it had been productive of the greatest good. (Loud cheers.) No one acquainted with the resources of this wonderful country could ever have doubted that it was destined to become at some future day a great and powerful nation. But its brilliant destinies had been vastly accelerated by the great discovery of gold; and presiding as he now did over its interests, he felt peculiarly proud in having been honoured with an invitation to share in the celebration of this great and most interesting occasion. He begged to thank them again for the kindness with which they had drank his health. His Excellency resumed his seat amid a storm of cheering.

Mr **Justice Therry**, in returning thanks for "The Bench and Bar," said, I trust I may be permitted to express the gratification I feel in being present at a festival commemorative of an event of such momentous interest to the destinies of Australia as the discovery of gold. It is an event which deserves to be ranked and regarded amongst the great discoveries of the world. And, although the advantages it confers may find some small present deduction in the inconvenience it may occasion to some classes, yet considerations of temporary embarrassment and partial depression become merged and obscured in the brilliancy of the great fact, that a new element of wealth has been discovered and added to the many pre-existing sources of opulence in the land,—that its discovery has directed and rivetted the eyes of all nations upon us, and that in exchange for our gold that abounds, those nations are now engaged in commissioning every wind that blows to waft the fruits of their industry to our shores. Nor are these the only advantages of this wonderful discovery. It has supplied us with that which we most wished for and most wanted—a multitudinous immigration, by which we have seen compressed within two years the arrival of a population that otherwise would have been scattered over a quarter of a century. And, again, look to the harbours of Port Jackson and Victoria, on whose crowded waters, within that same short period, the finest ships of the mercantile navies of England and America have floated. In gazing with admiration on those sudden and glorious results, let us not dim or darken the brightness of the vision by indulging in sinister and sullen ill-bodings of the possible evils that may be associated with or consequent upon this great event. To predicate of gold that it is liable to abuse, is only to announce—the no very notable discovery—that there is no earthly good so complete as to be free from imperfections. But the great blessings of Providence, and the augmented means which Providence permits human skill and genius to unfold for the benefit of mankind, must be measured and appreciated not by the conduct of those who abuse, but by that of those who wisely use them. As well might it be said that no man should seek to heap up riches, because there had been spendthrift heirs who wasted their inheritance. Sentiments such as these should not damp our this day's rejoicing—but our hearts should bound with joyous hope and humble confidence that, by wisely using the precious metal with which the Great Giver of all gifts has gifted us, this young and much-favoured country—whose first formation and settlement is in the memory perhaps of some now present—may, within the short period of the life of man, so rapidly prosper as to equal the commercial grandeur and social advancement of the older communities of Europe, which have only been brought about and achieved by slow degrees of progressive improvement in a series of centuries. (Loud cheers.)

The CHAIRMAN then requested that a special bumper might be filled. The toast he should now have the honour to propose was, in fact, the toast of the evening. They had met here to night to celebrate that great event, the discovery of gold in Australia. When he considered the short period that had elapsed since that event, he could not but marvel at the vast progress which had been made by these colonies; he could not but feel the immense importance of those great results which had flowed from the discovery of gold—results of which he could not have had the remotest suspicion at the time. In the month of April, 1851, Mr Hargraves waited upon him with only a few grains of gold—almost the minutest quantity that could have been conceived; so minute were these grains that he could hardly perceive them without putting on his spectacles. And yet all that Mr Hargraves then so boldly predicted had come true. Never could we have anticipated that in the short period which had elapsed 173 tons of gold, in value above fourteen millions sterling, could have been produced by the sister colony of Victoria alone. Such a result it was impossible to foresee—almost impossible to conceive. He had himself, indeed, as far back as the year 1848, been under the impression that gold would be discovered in this country; and in 1819 a nugget was actually shown to him by Mr Smith, and exhibited to the Governor-General. Mr Smith claimed a reward for his discovery, offering to disclose the locality whence he had obtained his specimen. To this the Government made the same answer as they had done to Mr Hargraves, namely, that the reward must entirely depend upon the nature and value of the discovery. Mr Smith was not satisfied with these terms, and kept the secret to himself. But Mr Hargraves came from California, and by his practical skill as a miner had made the discovery of gold in the Summerhill Creek, which they were now assembled to celebrate. Other parties subsequently claimed a reward, but by that time 300 or 400 persons were already at work, and the Government refused to recognise any claim but that of Mr Hargraves himself, who was the first individual who had practically made known the treasures that were concealed in the bosom of the earth. He had said that he did not anticipate the vast effects this discovery would have on the destinies of these colonies. Still less could he have anticipated its wonderful effects on the destinies of England herself, and the whole of Europe. Those effects had been of a most extraordinary character. Already had the immense supplies of gold greatly changed the relative value of all other commodities; but its most astonishing results were shown in the extensive emigration which it had induced, not only from the mother country, but from many other parts of the European continent—an emigration which had been described by the leading journal of England—the leading journal of the world—as assuming the character, not of relief only, but almost of exhaustion. Who for a single moment could have supposed that such portentous results would flow from the discovery of gold by Mr Hargraves? But it could not be doubted that this discovery was an abundant blessing to these colonies; the plethora of gold had increased the value of every description of property—had benefited every class of persons. He would not except the agricultural and pastoral interests themselves. Already the value of stock and stations had been largely increased; and those anxieties which naturally were indulged in, and those difficulties which at first arose, had now been entirely allayed and dispelled. It was a matter of especial congratulation, also, that the discovery was made at so opportune a period—a period when the penal character of the colony was fast disappearing – had in fact disappeared. A period when the natural resources of the colony had been already developed to a great extent—when an abundant supply of food had been actually in existence, to meet the wants of thousands who had poured in upon our shores. One of the most agreeable considerations connected with this event was, that the superabundant animal stock which, to the great regret of every right-thinking man, had been necessarily boiled down for the mere tallow it would produce, would now be applied to the more legitimate purpose of feeding whole families of men. But the prosperity of the colony had been enhanced in many other ways. It was specially evinced in the large increase of deposits in the banks, in the increase of their coin, and in their note circulation. The recent returns of the Savings' Bank, an institution with which he was proud to be connected, showed an enormous increase in the number and amount of deposits, a pleasing and satisfactory proof that the lower classes had participated in the general prosperity. Another circumstance, evincing the value of the gold-discovery, was the importance which Australia had suddenly acquired in the eyes of England and of the whole world, which would never have been the case but for the gold-discovery. Before that event few indeed were those who knew anything even of the geography of this great island continent; but now Australia was in every one's mouth, and an emigration had begun to these colonies which was unparalleled in the history of the world. They had attracted the special attention of the great manufacturers of Yorkshire. No less than fifty per cent. of the raw material of England's woollen manufacture was now supplied by these colonies; and by the alarm which had been created lest the supply should fall off, the greatest interest had been induced in England for the support and maintenance of the pastoral interest of Australia, and no means had been left untried which would tend to their conservation and extension, and thus the pastoral interests which had apparently been threatened with ruin, would now receive fresh encouragement and flourish again with renewed vigour. It had been well said by Mr Justice Therry, that the discovery of gold was liable to be converted into evil; but by a wise and temperate use of the gift of Providence, it might be, and had been, converted into the greatest blessing. To these sentiments, so eloquently expressed by his honourable and learned friend, he would add nothing, but propose at once the toast of the evening—the great event we are met to commemorate—" the Gold-discovery in Australia."

The toast was drunk with deafening cheers.

The COLONIAL SECRETARY then rose to propose the health of Mr E. H. Hargraves, the first practical discoverer of gold in New South Wales (Several rounds of applause succeeded the mention of Mr Hargraves' name). It was not his (the Colonial Secretary's) idea to derogate in the slightest degree from the philosophical theories of Sir Roderick Murchison, or the Rev. W. B. Clarke, but one fact was undeniable. It had fallen to the lot of Mr Hargraves, who had acquired his practical knowledge in California, to prove that Australia was an immense gold-field. The first specimens which Mr Hargraves had shown to him were of the minutest character; but soon afterwards, by mere chance, an American gentleman, who had had the experience of two years' in California, and to whom he (the Colonial Secretary) had shown them, assured him that the specimens varied greatly in character; some being similar to the gold found in the north fork of the Feather River; some similar to that found in the south fork of the same waters; and some similar to that found in the Yuba River. Now, looking at the map of this great colony, and considering the extent of the Bathurst district, in which Mr Hargraves had stated that he had found these specimens, he, the Colonial Secretary, could not be deemed presumptuous in entertaining the belief that if gold similar in quality to the gold of California had been discovered in Australia, gold in similar quantities would also be found. But a very few months elapsed, and the great fact was realised. The local Government saw that an unexpected emergency had arisen, and, without a precedent to guide them, they prepared to meet it. Regulations were proclaimed, in the framing of which the experience of Mr Hargraves in California was found to be of much service; and, from the first to the last, the practical experience of that gentleman had been productive of results to the Australasian colonies the value of which the most sanguine could not foresee. It was with great regret that he (the Colonial Secretary) had received a note from Mr Hargraves, stating that he was suffering from severe indisposition, and that he should consequently be unable to attend the Gold Anniversary festival. He (Mr H.) had added the expression of his high gratification at being apprised of his name appearing in the list of the toasts of the evening; and it was with sincere pleasure that he (the Colonial Secretary) then proposed it. The toast was drunk with all the honours.

Mr MORT, in rising to propose the next toast, " The Commercial, Pastoral, and Agricultual Interests of tho Colony," said that, although the discovery of our gold was of the very highest importance, these interests were no less important to New South Wales. Our golden fleece, our golden grain, would serve us in an hour of need, when perhaps gold would be valueless; and therefore, while we lauded the discovery of the latter, we ought not to forget what we derived from the possession of the former. That the interests which were included in the toast had been benefited in a great degree, he (Mr Mort) would show in a very few words. First, as to the commercial interests. The Commercial Banking Company's recent dividend, amounting to no less a sum than 100,000*l.*, must convince every one connected with mercantile affairs, that the gold-discovery promised to make the merchants of Sydney, like those of the once magnificent cities of the Mediterranean – "Merchant Princes." With regard to the pastoral interests, he (Mr Mort) would ask whether wealth was not being forced upon the squatters by the gold-discovery? The result of recent sales of stations in the southern districts proved the increased value of squattages: and in cases where sheep had been forestalled at 8s. or 10s. a head, it was now found difficult to buy them at 25s. He (Mr Mort) would express his sincere belief that there was not a squatting station in the territory that had not, more or less, increased in value by reason of the gold-discovery. The stone had been thrown into the water, and one and all came within the circle. Those who represented agricultural interests professed to have some hesitation as to the present, but surely they could have no doubt as to the future. The daily increasing demand for bread-stuffs, the anxious inquiries by new arrivals for small farms, and many other signs to which it was scarcely necessary to allude, ought to assure the agricultural interests of New South Wales that the day was not far distant when they would participate in the full extent in every advantage which the discovery of gold promised to the colony. Although not mentioned in the toast, he (Mr M.) must refer to a fourth interest, namely, the labouring one. Whatever doubts might arise as to the effect of the gold-discovery upon others, there could not be a shadow of a doubt as to the incalculable advantages which it had given to the labouring classes. Having referred to the matters which were included in the toast confided to his hands, he (Mr Mort) desired to say a few words in respect to the claim so properly made by Mr Hargraves, to be recognised as the discoverer of gold in New South Wales, and he would state one circumstance alone which the most sceptical must allow would entitle Mr Hargraves to the award of all the praise which his friends claimed for him. Some time ago Mr Simpson Davison, a colonist of New South Wales, left Sydney for California, leaving him (Mr Mort) to transact certain agencies for him. In Mr Davison's honour and integrity all that knew him had the highest confidence. It happened that in California Mr Hargraves and Mr Davison fell into some companionship and partnership; but the former, as every one knew, resolved to return to what he felt assured was a gold-field in New South Wales. Now, after the golden discovery had been made by this gentleman, and the news had reached California, he (Mr Mort) had seen a letter addressed to Mr Hargraves by Mr Davison, in which he says—"When you left California for the avowed purpose of discovering gold in New South Wales, you promised that when you were made a gold commissioner you would make me one of your clerks; but allow me, by this note, to introduce my brother, to whom I beg to transfer your promised good offices." This, as nearly as he (Mr Mort) recollected, was the contents of the note. He knew Mr Davison's hand-writing, and he asked if any stronger proof of Mr Hargraves's claim could be found! With respect to the merit of the discovery, it ought to be always borne in mind that no less than nine geologists had previously gone over the very country where Mr Hargraves had found the gold, but had failed to discover the auriferous character of the region; and further, that not one aboriginal had ever brought in a speck of the glittering metal. These astounding facts surely told for their friend Hargraves! With regard to the suggestion in some quarters, that the discovery of gold had been a curse, in place of its being a blessing to Australia, any remarks of his, after what had fallen from Mr Justice Therry and the chairman, must be superfluous. Nevertheless, he (Mr Mort) would say, that he who gave utterance to such a thought was guilty of gross selfishness. Could that be deemed a curse which elevated a colony, with its penal character not quite effaced, into a magnificent nation?—a nation which even England would soon look to with respect. Who could affix a limit to the resources of Australia? Who that had sons before the gold discovery had any other resources than to send them to tend sheep in the interior, or to send them to Europe? Now, a new state of things had arisen, and the colonists of New South Wales were about to build a new world. They would encourage, nay would raise, manufacturers, engineers, and other skilled persons, and what was done in the mother-country would soon be done here. Consider the genial climate, the rich arable soil, the plains of pasturage, the wonderful mineral treasures of New South Wales, and then ask, whether this indeed is not "the promised land." Who then that desired to stimulate the enterprise of their sons would venture to denounce the discovery of the Australian gold-fields as a curse? To another, and to a most important point, he (Mr Mort) would next solicit attention. He had adverted to the good effects of the gold-fields upon the colonists in their capacities of citizens and fathers. He would now emphatically refer to the value of their discovery in making good Christians. All the missionaries from all parts of the world who had so zealously laboured in the islands of the South Seas for many years have done less than must inevitably be done in a very short time by the gold discoveries upon the great continent. Gold is the main-spring of commerce; commerce is the forerunner of civilisation; and civilisation is the handmaid of Christianity.

Mr **Donald Larnach** returned thanks on the part of the commercial interest; and, in alluding to the liberality of our new tariff, to the great and increasing demands for all kinds of pastoral and agricultural produce, expressed his sincere belief that every interest in the colony had been enhanced by the discovery of the gold-fields.

Mr **William Bowman**, who was loudly called for, returned thanks on behalf of the pastoral and agricultural interest. He said that both grazier and farmer had necessarily watched with great anxiety the effects of the gold discovery upon the rural labourers. They had in the first instance desponded, but he believed that both interests now looked at the event as a cloudy morning bursting into a sunny day.

The local Press in its comments especially noted that very few of the leading merchants or independent public men had attended the Gold Discovery Banquet. The Government officials, it observed, had been the chief guests, and these had complimented each other in an extraordinary manner. Mr

Henry Parkes, a Member of the Legislative Council, and the publisher of the 'Empire,' Sydney journal, explained the remarkable absence of influential residents in the following published address to the Citizens of Sydney :

GENTLEMEN,—On the 23rd of December, 1851, a public meeting, convened by advertisement, was held in the Royal Hotel, presided over by Mr Charles Cowper, at which the following resolutions were unanimously adopted:

1st. Moved by Mr T. S. MORT, seconded by Mr THOMAS HALE—"That a committee be appointed for adopting such means as to them may appear most desirable for securing to E. H. Hargraves, Esq., the most suitable mark of the approbation of the Colonists of New South Wales, for the services rendered by that gentleman in the discovery of the great gold-fields of Australasia."

2nd. Moved by Mr G. A. LLOYD, seconded by Mr JOHN FAIRFAX—"That the following gentlemen be appointed a committee, for the purposes named in the foregoing resolution, with power to add to their number:—Mr Cowper, M.L.C.; Sir Osborne Gibbs; Messrs J. S. Rowling, R. Tooth, P. N. Russell, Henry Flavelle, J. Macnamara, J. Croft, T. S. Mort, T. W. Smith, T. Hale, G. A. Lloyd, A. Fairfax, R. S. Ross, H. Parkes, S. Peek, J Fairfax, J. G. Cohen, A. B. Spark, Tucker, Dawson, Cooper, and Dr Douglass, M.L.C."

As a member of the Committee appointed by the last resolution I cannot refrain from calling your attention to the nature of its origin and objects, as lending no sanction whatever to the recent public entertainment, which has been held under its auspices. If I were acting only with a view to the vindication of my own character for consistency, I should hesitate at inviting your notice to a matter of so little public importance; but I beg you to be assured that if public bodies, called into existence by your voice, and consenting to take upon themselves the duty of carrying out your clearly expressed opinions, are permitted to lose sight of their specific objects, and engage in matters never for a moment contemplated by you as their constituents, such laxity of conduct will speedily grow into an evil of serious consequences to the community. It appears to me of the utmost importance, for preserving the integrity of public business, that committees should adhere to a line of conduct directly promotive of their specific objects, and should diverge from that line for no other purpose, collateral or otherwise. Thus if a committee of gentlemen were appointed to do honour to the Colonial Secretary, they should, I humbly submit, employ their whole energies to that end, "dismissing from their minds," for the time being, the merits of others, though possibly greater and more generally acknowledged. Now, in the case under discussion, you appointed a committee to adopt such means as might appear the most desirable for securing to Mr Hargraves a testimonial of the public regard for his services to the colony; this exclusively was mentioned, and this was clearly defined, in your resolution. This business alone engaged the attention of the Committee for a period of twelve months. On the 30th of December last, a meeting of its members was held, pursuant to advertisement, in the Royal Hotel, and at this meeting the appropriation of the funds collected was discussed and decided upon. It was considered, for reasons fully stated at the time, that the most desirable way of testifying the feeling of the community for Mr Hargraves, would be to entertain him at a public dinner, when a golden goblet, of the value of 250*l.*, with the balance of the subscriptions in sovereigns, should be presented to him. The dinner was accordingly appointed for the 12th of February, the anniversary of the gold discovery. By a resolution, moved by himself, the Secretary was requested to send special invitations to several gentlemen of eminence, including Mr Lamb and Mr Campbell, members for the city; Mr Smart, member for the Sydney Hamlets; Sir Charles Nicholson, Sir Alfred Stephen, and the Colonial Secretary; my object in moving this resolution being to remove all semblance of party from the character of the entertainment, and to make it in fact a fair representation of both Government and people. Not being enabled to attend the next meetings, I was not aware of the business done till I noticed in one of the daily papers, about a month afterwards, a paragraph to the effect that all the heads of the Government departments, their Honours the Judges, a number of military officers, with the Speaker of the Legislative Council, and his Worship the Mayor, had been honoured with special invitations to the banquet, and that the Colonial Secretary had been requested to preside on the occasion. By inquiries which I immediately made, I also learnt that not only had the members of the city been overlooked in these invitations, but that no single citizen of any degree, excepting the Mayor and Sir Charles Nicholson, had received the same compliment which had been paid to the Postmaster-General and Captains D'Oyley and Wynyard. The very name and style of the dinner, too, were changed. The name of Hargraves had been expunged from the title-page. The Committee appointed by you to consider the most suitable manner of honouring the Gold Discoverer, had taken upon themselves the celebration of the anniversary of his Discovery, from which they had carefully excluded even his name. Your "Hargraves Committee" had coolly thrown Hargraves into the background, in the consummation of their labours. My first idea was to attend the next meeting of the Committee, and at least express my own sentiments of dissent from these proceedings; but upon referring again to the published report of the last meeting, I found that a Sub-Committee had been appointed to complete the arrangements for the dinner of which I was not a member, and therefore, as no subsequent meeting of the original Committee was held, I had no further voice in the matter. The dinner was henceforth announced as "The Gold Anniversary Banquet," and the idea of its being a dinner to Mr Hargraves was industriously repudiated by the Committee, though it was still understood that the presentation of the testimonial to that gentleman was to form the chief ceremony of the evening. On obtaining a copy of the programme on Saturday, I found, however, with feelings of surprise which I make no doubt will be shared by many of you, that Mr Hargraves was not even to "play second fiddle" on the occasion, but was actually to be the ninth peg provided by the "Hargraves Testimonial Committee" for after-dinner orators to hang their speeches upon. The toasts of the evening were arranged as follows:—

1. The Queen.
2. Prince Albert, the Prince of Wales, and all the Royal Family.
3. The Governor-General.
4. The Army and Navy.
5. The Judges and Bar.
6. Prosperity to New South Wales.
7. The great event which we are met to commemorate—the Gold Discovery in Australia.

8. The Honourable Mrs Keith Stewart, and the ladies of the Colony.
9. *Mr Hargraves.*

Under these circumstances, the colony will not be surprised that no public man, with any character for independence to lose, attended the dinner on Saturday evening; and I am sure it will be felt by every well-informed Englishman that his Excellency the Governor-General, as the representative of her Majesty, was rather insulted than honoured by being invited to a public dinner, ostensibly of the citizens of Sydney, which was presided over by the chief executive officer of his own Government. I am, &c., HENRY PARKES.

Sydney, February 14.

Soon after the Sydney banquet the gold-fields of the western districts were visited by Mr Hargraves and myself, and in course of travel we together attended by invitation a public dinner in Bathurst, especially given for presenting a testimonial to my companion from the local residents. The Colonial Secretary at this time was spending the holidays with Mr Icely at Coombing (a short day's journey beyond Bathurst), where we both remained awhile. Mr Thomson declined, however, to attend and take the chair on this occasion. The 'Bathurst Free Press' reported as follows the entertainment of the HARGRAVES TESTIMONIAL PUBLIC DINNER.

The friends of Mr Hargraves having determined to invite him to a public dinner on the occasion of presenting him with a Testimonial, assembled some fifty in number in Mrs Whitton's ball-room, on Saturday evening last. W. H. Suttor, Esq., M.L.C., by special appointment occupied the chair, supported on his right by the guest of the evening, and by Mr Hargraves's friend and travelling companion, Mr Davison, on the left. The vice-chair was occupied by Henry Heathorn, Esq., J.P., who was supported on his right and left by T. D. Syer, Esq., and Saul Samuel, Esq., J.P. Everything in season was provided for the occasion, and the wines, not forgetting the champagne, were excellent of their kind. This part of the evening's performances completed and the cloth removed, the president gave the following toasts, which were vociferously received:

Her Majesty the Queen.
Prince Albert and the Royal Family.
The Governor-General.

Mr Suttor then rose to propose the toast of the evening, and said: You are no doubt all aware of the occasion which has brought you together. You are assembled to do honour to Mr Hargraves as the discoverer of the Australian gold-fields, by presenting him with a testimonial as a token of your approval. Many classes have benefited to a very considerable extent by that most important discovery of which he was the author, but the class to which I belong I am sorry to say are sufferers to a considerable extent. I would, however, be amongst the last in the country to depreciate or cry down the gold discovery. The sufferings of the squatters I am of opinion will only be of temporary duration, and the day will come when they will be partakers of the golden bounties of the times. I am sorry upon looking round the table to see so small a number present, and the more particularly so to observe almost an entire absence of squatters. The impression I am aware prevails extensively amongst them that they will be permanently injured; my own is that all will be ultimately, and to a very great extent, benefited thereby. As regards the gold discovery, it is quite obvious that it is not the work of a mere accident. The credit is doubly due to Mr Hargraves that he came from California to New South Wales full of the idea that after extensive travelling and research he should find it a gold country. He persevered, and at the expense of much time and labour was finally successful in opening up the gold mines of Australia, now proved to be the richest in the known world. Mr Hargraves will shortly leave this for the mother country, and I hope that during his absence we shall continue to advance as we have already advanced in wealth and population, and go on making new discoveries. Then turning to Mr Hargraves, he pointed to the tea and breakfast service, and said: I am deputed by the Committee to present you with this Testimonial in the name of the inhabitants of Bathurst, in token of their approbation of the eminent services you have rendered these colonies, by discovering the existence of rich and extensive gold-fields.

The service was then presented, upon one of the pieces of which was the following inscription:

PALMAM QUI MERUIT FERAT.

Presented to Edward Hammond Hargraves, Esq., the discoverer of the Gold-fields of Australia, by the Inhabitants of Bathurst, in token of their appreciation of his services in opening up one of the most important resources of the colony, and thus adding materially to its wealth, and promoting its commercial and social advancement.

Mr Hargraves rose and said: Mr Chairman and Gentlemen, It is impossible for me to express the sense I entertain of the honour you have done me, or my gratitude for the kind manner in which your assurances of the value of my services have been communicated to me. Gentlemen, the interest you have expressed for my welfare is the more grateful to me from the very painful reflections that have been caused during the past year, by contemplation of the evils inseparable from the discovery—evils that are inseparable from every change which, however beneficial, has a tendency to alter the condition of large masses of the people, and to unsettle many of their most important relations. That such changes have resulted from the discovery of gold in these colonies cannot be denied,—that the great increase in the prices of all the necessaries of life has pressed heavily on all those who are dependent on fixed incomes is deeply to be deplored; but that therefore the discovery has not been most providential can be asserted by those only whose views of the prosperity of their country are confined to the immediate circumstances of their families. Who ever viewed the destruction of a noble forest without regret? Who would allow his regret at the desecration of the sylvan scenery to oppose the operation that is to convert the savage wilderness into a fit place for the habitation of civilised man? Gentlemen, if anything can add to the value of your assurances, it is the complete refutation they afford to the observations which were recently made in the Legislative Council respecting my discoveries. Of these observations I am not, perhaps, here entitled to complain, but it is highly gratifying to me to know that they have made no impression on your minds which is injurious to me. Gentlemen, in connection with this discovery the honour and glory of the perfect knowledge of its existence have been claimed by an illustrious scientific gentleman in the mother country, and by a reverend gentleman in this country, the former of whom complains that the latter has "trodden upon his toes," but I protest against either of them treading upon my toes, although I have no corns. Now, without intending the least disparagement to their scientific attainments, or impediment to their ambition for fame, there is one great fact connected with their scientific prophecies, viz., that gold and gold-bearing rocks, the produce of New South Wales, were placed in their hands previously to those prophecies, and I, upon whom the light of science had scarcely dawned, conceived these prophecies to have been very safely made. It is a well-known fact that specimens of gold had been found in this country years before the first prophecy, and long before the reverend gentleman's arrival on these shores. I much regret the recent injury inflicted on the colony by the British public having been swindled out of half a million sterling by exaggerated reports said to have emanated from this country; if so, it has been the consequence of either villainous design or the fruit of a diseased brain. Let us hope the latter was the case. Australia needs no such exaggerated accounts of her gold-fields; they are rich enough. This half million swindle will never return the proprietors a halfpenny yearly pér share, and will prevent many gentlemen having really valuable auriferous lands in this colony from making legitimate disposal of the same. When in England I shall always speak of Australia as she is, and tell the plain, naked, honest truth of the gold-fields as they are, and as I always have done in this country, however valueless my opinion may be. Mr Chairman, in thanking you for the extremely beautiful tea and breakfast service you have been deputed on behalf of the town and district of Bathurst to present to me, I beg you will assure the gentlemen who have contributed towards so costly a testimonial that I shall ever highly value their gift, and entertain the most grateful remembrance of the contributors. Gentlemen, nearly two years have elapsed since I had the honour of publicly announcing my discovery in this town (A voice: It was the 8th May), and I perceive on this piece of plate is inscribed on the first line, "*Palmam qui meruit ferat*"—let him who has earned the honour have it. This, then, gentlemen, is your verdict after nearly two years' deliberation. I feel justly proud of the possession of this service, given by the inhabitants of this district, the birthplace of my reputation. Gentlemen, it is impossible for me to express the thanks that are due to you for the honour you have done me. Mr Hargraves concluded amidst great applause.

Mr HARGRAVES requested permission to propose a toast. The toast he was about to propose was the health of Samuel Stutchbury, Esq., the Government Geologist, an individual of highly scientific acquirements, practical good sense, and quite the "Old English Gentleman," who had always allowed him (Mr Hargraves) the full merit of his discoveries with a degree of candour and honesty rarely surpassed. He therefore requested the toast to be drunk with all the honours.

Dr M'HATTIE responded.

The CHAIRMAN next gave the Commercial, Pastoral, and Agricultural interests.

Mr SAMUEL, being loudly called upon to reply to the pastoral interests, said, Mr Chairman and Gentlemen, although not now a squatter

I once was, and have yet the welfare and prosperity of that important section of the community at heart. But, gentlemen, I deny most emphatically that any particular interest has suffered from the gold discovery, and I do so after mature reflection upon the subject. The country never enjoyed so large a measure of prosperity as at the present moment, and we may thank the gold for it. True the stock-holder has to pay a higher price for his labour, but the equipoise between his outlay and his income is restored by the increased price which he receives for his produce. Formerly the millers had the control of the grain market, now it is in the hands of the farmers. In those times there was a superabundance of grain, and the prices were therefore low. Now the supply is about equal to the demand, and instead of being compelled to thrust his wheat into the market as then, to pay his rent, the agriculturist can in these times afford to keep it in the stack until he can obtain a remunerative price for it. It must be in the recollection of all that the most fearful alarm pervaded the country on behalf of the sheep-farmers when the news of the gold discovery broke upon the world. Report had the sheep turned loose in the bush by thousands, but fortunately, like the alarm, it was ill-founded. Before ours was known to be a golden land flock-masters received 3s. 6d. to 4s. 6d. per head for their sheep and stations—now they readily realise 12s. to 14s. per head, and these facts I consider conclusive. The only class who had *bonâ fide* grounds of complaint are the recipients of fixed incomes, but in the course of time they will resume their natural positions. Existing interests have unquestionably been disturbed, but that disturbance, like any other, must gradually settle down into the natural course of things. Let every facility be offered to the working of our gold mines, so as to induce a large population to settle amongst us, and when exhausted, as they must be in the lapse of time, we shall then have abundance of labour to tend our sheep, cultivate our farms, and to develope the vast resources of our country. Instead of a source of sorrow or complaint, the gold, in my estimation, ought to be a cause of rejoicing. It will make this one of the wealthiest and most flourishing empires of the earth, and give an impetus to arts, science, commerce, industry, and every pursuit which can tend to a nation's greatness and grandeur. The pastoral and agricultural will always be important branches of our industrial system, but whilst disposed to respect vested interests, I should most determinedly oppose any attempt to protect or foster one at the expense of the rest. (Loud applause.)

The health of Mr Hargraves's friend, Mr Davison, having been proposed by the Vice-Chairman—

Mr Davison, on rising, said, Mr Chairman and Gentlemen. in returning thanks for the very handsome manner in which you have proposed my health, and for the cordiality with which it has been responded to, I must own that I feel quite inadequate to the task of sufficiently expressing to you my gratitude. I have no pretension to excellence as a public speaker, whatever merit I may possess as a gold-miner. But it has been my lot to have been associated with Mr Hargraves from the commencement to the termination of his Californian campaign, and I know exactly all the operations of his mind during that period, relative to the existence of gold in New South Wales, from the first admission of probability to the maturity of conviction. (Approval.) On our first arrival at Wood's Creek—a tributary of the Stanislaus River—in California, during November, 1849, Mr Hargraves, after some preliminary conversation on the subject, remarked: "Why, if this be the gold country, I know a district precisely like it in New South Wales, near Bathurst." (Cheers.) In our many conversations in California respecting the difficulties of the Australian Government, and the dangerous position of the sheep-owners (if gold should be found), Mr Hargraves once remarked (this was in our tent on the Yuba River, in October, 1850), that he had already considered all those things, and we agreed in opinion that his first duty on discovery would be to inform the local Government of the discovery, and that Gold Commissioners would have to be appointed, regulations made, licences given to diggers, and I may now say that whatever may be the merits or the demerits of the licensing system, it was then not considered so much with reference to its being a source of revenue as a check against the absconding of shepherds or other hired servants, which it was anticipated would prevail when the existence of gold (if discovered) was announced. In the summer of 1850 we travelled together over extensive tracts of auriferous lands, from the Southern to the Northern mines, and during these observations the opinion seemed to grow that the district which Mr Hargraves had seen beyond Bathurst many years before must be in every respect a gold country like California. (Approval.) In September and October previous to his final resolution of returning to Sydney, his daily gains were from 3*l*. to 4*l*., which he averaged with great regularity, my own being then about the same amount, though at that time, during a short period, for mutual temporary convenience, we did not work together, nor share our gold-dust, although living in the same tent. I know that these observations are now of little importance, because the fact of the gold discovery by Mr Hargraves is well established by universal assent, and by acknowledgment of the Government, but they will perhaps afford gratification to those friends who supported his claims and pretensions at a time when they were not so universally acceded to. It may be of some interest to relate what my own impressions were at that time. I had left under management a sheep-station in the district of Maneroo, near the Jingera ranges, upon which I had been living some time previously to leaving the colony for California. The base rocks upon the sheep-run were granite and schist, with a considerable quantity of quartz. I knew that gold was usually associated with quartz, and I frequently examined there the veins of quartz for the purpose of finding gold, especially during the month before last leaving the sheep-station, the first accounts from California having then reached this colony. Every new shepherd I employed would also bring in pieces of shining mica or mica slate, and ask me if it were not gold or a good indication of gold. When Mr Hargraves had concluded upon returning here, I said, "if our views be correct respecting gold in alluvial deposit in New South Wales, if it be anywhere, depend upon it you will find it on my run. I will give you a letter to the gentleman in charge of my sheep, and you had better search on such and such creeks," which I then described. I had never seen the Western districts, in whose golden wealth Mr Hargraves had so much faith, and consequently I could not form so decided an opinion of them. The sequel of all this was that alluvial gold was found by Mr Hargraves in the districts near Bathurst already alluded to. My run was not examined until sometime afterwards, when it was found everywhere auriferous, although not sufficiently so to be yet considered so worthy of digging as many other parts of the colony.

I regard this meeting as the most important that has ever taken place or that ever will take place connected with the gold discovery.

There may be other meetings (and it is written on the page of futurity that such will be the case); those meetings may be more numerously attended, or they may represent greater wealth; but my impression is that you gentlemen do not yet know the full extent of your own wealth. You have yet to learn your own opulence, more particularly the landed interest. A flood of capital and emigration is now pouring on these shores, daily increasing the value of landed property, the enhanced value of which is not so immediately apparent as an improvement in the price of merchandise or other property which is daily and constantly changing hands. As I observed, this is the most important meeting that will ever take place, because it is nearer the scene of action, nearer the place of the great event—the gold discovery—than any other can ever be. You are witnesses of all the circumstances attending the discovery and the developement of the gold-fields. No false rumours or *ex-parte* reports can deceive you, and your acknowledgment of Mr Hargraves as the discoverer is more conclusive on the matter than any other evidence can possibly be. You, gentlemen, know collectively all the circumstances relating to the discovery since Mr Hargraves landed on these shores, of which I know nothing. I know individually, as I have explained (and there is none other who knows so well as I do), all the circumstances attending the discovery previous to Mr Hargraves's departure from the shores of California. (Cheers.)

The "Press" was acknowledged by Mr Farrand, and Mr Shadforth as usual grew eloquent in behalf of the ladies. After expatiating most poetically upon their softer qualities, he compared them to the purity of our native gold, the brilliancy of our diamonds, and professed himself to be desperately in love with the whole sex. He concluded by giving birth to an original idea, which we here record as a study for the philosophers, namely, that woman, lovely woman, was discovered before gold. The Chairman, Stewards, and a variety of other toasts were given and responded to, and after a very pleasant evening, agreeably diversified by song, toasts, and sentiment, the party broke up precisely at midnight.

Attending this meeting as I did by special request, as the travelling companion of the gold-discoverer, my address could not be otherwise than complimentary to Mr Hargraves. I have since been told that my affirmations on the occasion determined favourably many persons who were previously sceptical concerning Mr Hargraves's claims to the gold-discovery, and that my recognition of his local discovery was understood to be a relinquishment of all intention on my part ever to put forward the merits of my own induction of the generally auriferous character of the interior of Australia. I cannot think, however, that my remarks at this ovation will bear any such construction. The meeting was especially called to present a testimonial to Mr Hargraves for the services which he had rendered to the particular district, and it would have been quite out of place in that assembly to have insisted upon my own rights to the general discovery, or to have entered upon any philosophical arguments to have proved that the previous quartz matrix gold-discoveries were distinct from the placer deposit gold-discovery. There is not, however, I may now allege, a single assertion in my speech with respect to Mr Hargraves which is not equally true of myself, so far as regards what occurred in California; but remembering that "of their own merit modest men are dumb," I certainly did not think that before a local audience in Bathurst I could especially urge my own claims with propriety. The discoveries and services of all other persons (except those of the shepherd near Wellington) were at this time entirely unknown to me, and entertaining the theoretical opinions which I did in opposition to men of science, I could not but rejoice at Mr Hargraves being called "The Discoverer of the Gold Fields of Australia," since his hand had really first demonstrated my views in ascertaining the presence of the metal in placer deposits.

On our return to Sydney, being requested to write a very short official report for Mr Hargraves to sign, and a *carte blanche* being also given to say whatever I chose favourably of myself, I accordingly drew up the following Report on the WESTERN GOLD FIELDS:

Letter from Mr COMMISSIONER HARGRAVES to the COLONIAL SECRETARY.

Sydney, 10th April, 1853.

SIR,—I have the honour to report to you, for the information of his Excellency the Governor-General, the result of explorations and observations I have recently made on the auriferous lands situate at the respective heads of the rivers Turon and Cudgegong, at the established diggings on the Meroo, Louisa, and Tambaroora Creeks, on the River Turon, about Sofala, on the Wentworth Gold-field, at the diggings at Ophir, and upon other auriferous lands at Cooloolah Creek, and at Fitzgerald's Swamp on the Carcoar Road.

1. The head of the Turon near Benbullen, at the confluence of Dalhunty's and Cuinguin or Jew's Creek, is sufficiently rich to pay moderately; it has been partially worked, but is now entirely deserted; at a mile lower down there appears but little alluvial drift; the vertical schist is, however, rich in gold in some places, and the gold grains are of tolerably large size.

2. The Cudgegong River about Tannabutta and its small tributaries is everywhere auriferous, although nowhere proved to be particularly rich or apparently likely to be so; the neighbouring hills bear evidence of great igneous action; the alluvial drift in the river is considerable

in quantity, and remarkable for being imperfectly waterworn; the shingle and gravel consist chiefly of fragments of slate and trap, with the sharper angles only worn smooth by attrition.

3. On the Meroo, the Louisa, and Tambaroora the diggings bear every evidence of rich gold deposits being in the beds of the creeks, on the surface of the slopes, and probably in hill-digging, the last being almost untried. These diggings bear much resemblance to those of Bendigo in Victoria. Water being now scarce, the diggers here are few in number.

4. The company working on the "Great Nugget Quartz Vein" are diligently endeavouring to ascertain the extent and value of this claim, and are now in course of establishing more extensive machinery than is at present in operation. It appears extremely doubtful that this vein will ever repay the capital that has been expended upon it.

5. The bed of the River Turon for some miles above and below Sofala is proving to be very rich generally; all the diggers are doing well. The want of sufficient fall for the water, with the looseness and great depth of the gravel and shingle, present serious impediments to its profitable working, and the river will probably not decrease in yield of gold for two or three dry seasons, in proportion to the number of diggers employed upon it; the table land for some miles on the south of the river is highly auriferous, and dry diggings exist at the heads of several gullies. An abuse oi some magnitude exists by reason of individual diggers claiming several allotments in different situations, each of the size allowed to one person, to the great disadvantage and inconvenience of persons newly arrived, who can find no unclaimed ground in the bed of the river, although large tracts remain comparatively untouched; a system of registry would probably remedy this abuse.

6. The Wentworth Gold-field, at Frederick's Valley, is a description of surfacing around the base of a hill, the auriferous earth being but a few feet in depth, and containing gold-bearing boulders of a ferruginous character; the gold-impregnated earth is not, I think, likely to be so rich or so deep towards the summit of the hill; one shaft sunk upwards of thirty feet deep into the bed-rock is evidently far below the gold-bearing ledge; and one small hole, said to have been rich in gold at the depth of three feet from the surface, is effectually secured from further observation by having a large number of heavy logs placed directly over it; there is no hindrance to the immediate working of this field, the most simple processes being sufficient for obtaining the bulk of the gold, although it might be found afterwards profitable to crush and again wash the refuse of the first washing.

7. At Ophir the few diggers remaining are all doing exceedingly well, and there is abundance of room for more diggers.

8. At Coloolah Creek the digging is remunerative, and some deserted diggings on Fitzgerald's Creek will pay moderately; at Dunn's Plains some gold was also found.

9. I have been much assisted in these observations by the opinion of my former partner in California, Mr Simpson Davison, whose experience extends over three years in the gold-mines of California, with some months' practice in the gold-mines of Victoria, and who had acquired by personal observation a previous knowledge of the general geological structure of the colony of New South Wales.

10. The small number of diggers in the Western Fields may be attributed to the restless and migratory habits of diggers, and to the supposed superiority in richness of gold-fields on the Ovens River, more than to any other cause.

I have the honour to be, Sir,
Your most obedient servant,
E. H. Hargraves.

The Honourable the Colonial Secretary.

The alleged auriferous veinstone on the Wentworth Goldfield, as represented by the promoters of a public company for working this field, not being confirmed by us in this official statement, our observations upon it, together with the remarks on the Great Nugget Vein (a veinstone of which I entertained no very favourable opinion, and the correctness of both views have since been thoroughly substantiated), led to the following correspondence in the public prints. Some further account of the mines alluded to in the following letters is given in Appendix E.

The public correspondence between Saul Samuel, Esq., J.P., and E. H. Hargraves, Esq., Crown Commissioner for Gold Exploration, appeared in the 'Herald' thus addressed to the Editors, on the subject of The Great Nugget Vein.

Gentlemen,—My attention has been called to a paragraph in Mr Hargraves's letter to the Honourable the Colonial Secretary, published in the 'Herald' of the 14th instant, and to a letter from Mr Hargraves, in the 'Herald' of the 28th instant, in reply to one from Mr E. J. Spence (the Manager of the G. N. Q. V. Gold Mines).

The opinions expressed by Mr Hargraves relative to the Great Nugget Vein has occasioned me some surprise, as that gentleman a few weeks since informed me, at Mr Sub-Commissioner Buchanan's residence at Ophir, that he had *no knowledge nor experience* in quartz-crushing, and referred me for information on this subject to his friend Mr Davison (then present), who had recently returned from California.

It is only a short time since that Mr Harding, the Manager of the Australasian Gold Mining Company, condemned all the quartz-veins in this colony as worthless, and that without giving one a single trial.

I should not have stepped out of my way to notice this matter did I not consider it of great importance to the colony; statements like these being calculated to prevent the development of our mineral resources. A visit to the two quartz-veins now being worked will convince the most sceptical of the existence of quantities of rich gold ore.

I am, &c.,

Sydney, May 30, 1853. SAUL SAMUEL.

The reply of Mr Hargraves being as follows, and headed

MR SAUL SAMUEL AND THE GREAT NUGGET VEIN.

GENTLEMEN,—With reference to Mr Saul Samuel's letter which appeared in this morning's 'Herald,' I beg permission to make a brief reply, and if granted, I promise you, if the Great Nugget should be thrown at my head, I will not again trouble you. Mr Samuel in his second paragraph asserts positively that I stated to him, that *I had no knowledge or experience in quartz-crushing*, and referred him to my friend Davison, who had recently returned from California. I must congratulate Mr Samuel on his very retentive memory in recollecting the exact words. *I do not believe I ever made use of them;* probably he took a note and got it attested under the Commissioner's seal of office. The language is very unlike anything I should have been likely to say on such an occasion, and not having the slightest recollection of the circumstance I have no desire to make any uncharitable remark thereon.

While in the Western District I have frequently been thus questioned,—Mr Hargraves, what do you think of the Great Nugget Vein? What do you think of the Peel River Mining Company? What do you think of the Wentworth Gold Field? &c.

I have, in order to get rid of an unpleasant topic, referred them to my friend Davison, saying he had recently returned from California, and had seen more quartz gold-mining than I had, consequently was more conversant with it, but I believed in that country such speculations had, with one exception, crushed the proprietors (I mean, ruined them in a pecuniary view) not absolutely crushed—and made them into pancakes.

With respect to the opinion of Mr Harding, which Mr Samuel quotes, I having nothing to do with, neither do I subscribe to them; but in the present state of the labour market I think Mr Harding acted wisely not to commence operations, and I have no doubt will receive the thanks of his constituents for the sound discretion exercised by him on their behalf in this respect.

With regard to the last paragraph in Mr Samuel's letter, he says "I should not have stepped out of my way to notice this matter did I not consider it of great importance to the colony; statements like these being calculated to prevent the development of our mineral resources." In reply thereto, I beg to observe that few persons step out of their way except having some object in view. Mr Samuel professes to have done so purely for his country's good: I therefore trust his labours in this direction will be justly appreciated. With regard to gold companies in general, as at present constituted, and the state of the labour market in this country, I do not entertain a favourable opinion of them.

The exaggerated accounts of Australia's wealth, I believe, will produce a vast amount of misery, for which the originators of some gold companies will occupy prominent and unenviable situations. It is fearful to contemplate the frauds that have been perpetrated on the simple and unwary, the many happy homes that have been broken up, —the numbers of my fellow-men now being wafted across the ocean, full of hope bright as the morning star, on the faith of statements evident to me quite visionary; and this faith grounded on the character and reputation of individuals whose standing and previous good name have gained for them the tongues of *good report*. Yet, notwithstanding, some are blameless, and of spotless reputation (and sincerely believe in the legitimacy and profitable nature of the undertaking), others are faithless, designing, and dishonest, and, in my estimation, much worse than highway robbers, and the only distinction I can see between the two is, that one robs according to law, and escapes with his spoil, and the other, if caught, goes to a jury, and is subject to the penalties of the law. I hold the latter to be the most honest and honourable man of the two.

In conclusion, it affords me inestimable pleasure to say that, during the exciting scenes and circumstances of the past two years, I have no desire to recall a single opinion I have given in auriferous matters, although I sincerely hope time will prove me in error in some, or the cry of the orphan will be heard, and the widow's tear seen in connection with this (to me painful) subject, on which I have most reluctantly been drawn into controversy.

I have now only to reiterate my promises of not answering or noticing any further communications under any circumstances, and to remind my friends who have of late made a general target of me, that firing blank cartridge sometimes in return brings a real shot, and that it is easier to penetrate a fortress made of calico than one constructed of granite. I am, Gentlemen, yours, &c.

Sydney, 1st June, 1853. E. H. HARGRAVES.

The following extracts, taken from a report by Mr Hargraves on the Victoria Gold Fields (after his first visit to that colony) appeared next in order of publication in the local newspapers; they are not here reproduced for the purpose of wantonly exposing them to literary or scientific criticism, but since the document is the last official record of exploration made by Mr Hargraves, and it contains theoretical allusions, it may be fairly supposed to be an exposition of the theoretical views adopted by the writer at the time of its date. Mr Hargraves's "own theory" subsequently published (after his being furnished with my particular theory in writing) differs materially from the one given in this report, and I publish these extracts in order to enable the reader to compare the two. The London 'Times' pronounced this report to be a "precious document," but the leading semi-official journal in Sydney wrote, as usual, a strong article in its defence.

Report from Mr Commissioner Hargraves to the Hon. the Colonial Secretary on the Gold-fields of Australia Felix.

Sydney, 17th December, 1852.

Sir,—With reference to my letter, dated 25th of October, reporting on Spring Creek, I would add, it appears by the upraising of the granite that a large portion of the schist and quartz country has been shot off to the southward on the granite country, which would appear to account for the diggings lower down the Creek, as I was not able to detect the presence of gold in granite, although I searched diligently; the rock is hornblendic, and of the same class as the granite of Araluen. * * * * *

8. On nearing the Campaspie River, the whole country, for ten miles on either side of the river, is covered with traps. From that point to Sheepwash Creek, five miles from Bendigo, the country is precisely similar to the Abercrombie, near Mulgunnia, except the limestone; and the approach to this place of such extraordinary richness presents no striking feature different from other gold countries. The Emu, Ex, and Sheepwash Creeks produce gold in small quantity in the shingle below the alluvium.

9. From the Sheepwash Creek to Bendigo the rocks are quartz, schistose, mica, and talc, ironstone, shale, and granular quartz in great abundance. The quartz hills bordering the diggings are quite a facsimile of the Abercrombie country. You first strike the back creek, where a good deal of ground (good to all appearance) has not been tried. Some few hundreds are working well satisfied with results. You then pass over a small ridge and come in sight of the Commissioner's camp on Bendigo Creek, which is very prettily situated on an eminence overlooking Bendigo Creek, and very extensive diggings called the Bendigo, and the trading camp.

10. There is no peculiarity in the structure of the country; the whole flat and the adjoining gullies appear to have been submerged. The stratums appear in the order of their gravity, and it occurs to me that nothing short of the general deluge could account for such a deposit. The breaking up of the deep by volcanic agency and receding of the waters, as at no other period of the world's era does history furnish us with sufficient data to ground a belief that such effects could be produced by any other cause. This does not apply to the spurs of the first range beyond the bay inland, as here again abundant proof is visible of a very recent upraising of a great extent of country by volcanic agency. The basaltic scoriæ and trap, at and near Melbourne, contain the fossil remains of testacea, of the same species as those now inhabiting the waters of the Bay, as must at once be seen by the most superficial observant.

14. In the Commissioner's Gully the gold is found on the pipe-clay in a ferruginous soil, apparently burnt, and under shale and ironstone; also, in a clay slate. The holes are on an average twelve feet. Bendigo Creek, Golden Gully, Tipperary Flat, and Kangaroo Gully are of similar formation, and have proved very rich. A great portion remains yet unworked. The schistose rocks crop out on the hills in a north and south direction, and are covered up in the valley to the depth of from thirty to forty feet; these rocks have not been struck, and I should look for a deposit in them, even after passing through the pipeclay. The slate and clay where the gold is deposited is at times quite black; caused, apparently, from condensed smoke during the subter-

raneous fires. I visited Long Gully, California, Peg Leg, Eagle Hawk, Napoleon, Beelzebub, Devil's, Ceylon, Derwent, Devonshire, and White Horse, and had I seen this country before it had been worked, I should not have thought it a field of such extraordinary richness as it has proved to be. A great deal of ground remains unworked, with as good a chance of success as others have met with in working the adjoining ground. The whole country, for twelve miles in diameter, is of the same geological structure; and I do not doubt the richness of the Abercrombie Mountains, and feel thoroughly convinced that the gold deposits, both in Australia and Australia Felix, are far more extensive than the most sanguine anticipate. The only new feature I have observed here is the White Hills.

15. The White Hills are situated on the south side of Bendigo Creek. These hills present a new feature in gold-mining in Australia. They are covered with small quartz, ironstone, and broken slate; almost immediately below the surface there is a conglomerate, hard as stone, which is pierced through with great labour at various depths from five to twenty feet. The auriferous deposit is in a concretionary substance, immediately above the ledge, which appears to be chalk, and occasionally pipe-clay. The mode of working is to sink some five feet through the chalk or clay, as the case may be, and work the roof with gads and hammer. Some loads carefully taken off, I am informed on good authority, yielded 5lbs. weight of gold: fifty buckets to the load. The washing-stuff is very hard to be got, and ought to be well crushed and puddled before washing. Two loads washed produced 50 oz., one load 5 oz., two loads 2 oz.; mica schist runs through the clay in some places, in very fine laminæ, sometimes perfect and hard near the base of the hill. Some little surfacing has been done on the south-west side; specimens Nos. 3 to 13 will show the nature of this deposit. I would add the conglomerate through which the miners sink does not contain a sufficient quantity to pay just now; but it is deposited chiefly on the ledge; No. 14 will show a sample of clean gold from that locality; No. 15, the produce of about two ounces of refuse; No. 16, a specimen from the White Hills on the Mokelumne River in California, given to me by my friend and mining partner, while in California, Simpson Davison, Esq., who is now operating here on the White Hills. The depths are much greater in the California White Hills, and washing-stuff not so rich; the formation is something similar; they were not known to be auriferous when I left California, and most likely have been discovered here by some Californian accustomed to working in the White Hills of that country.

16. I have not seen any quartz veins here; the tops of the hills are capped with quartz, and are what miners call "Californian Tops." Threads of quartz running parallel with the schist are rich in gold in most of them; specimens Nos. 17 and 18 are the produce of one of these threads, sixteen feet below the surface. I have seen sandstone in an horizontal position, full of quartz crystals, at various depths, generally deep.

17. On leaving Bendigo Creek, about five miles towards Mount Alexander, the country alternates occasionally with trap; you then pass into a granite country, until within three miles of the Camp at Forest Creek, Mount Alexander, where there is a crop-out of basaltic whinstone, which you lose almost immediately, and come into the schists and quartz on Barker's Creek, where a good number of miners are working with tolerable success.

18. These diggings are known as Mount Alexander, but properly should be called Mount Byng, being so named by the discoverer of Australia Felix, Sir Thomas L. Mitchell, Surveyor-General of New South Wales; they are about from seven to nine miles in diameter, and comprise Forest Creek, Fryer's, Barker's, and Campbell's, Moor Pok Gully, and the usual number of diggers' names for flats, hills, and gullies. Forest Creek has been most extensively worked, the richness of which has often been recorded. The country here is of a peculiar striking character, and much resembles some parts of Summer Hill; compact schist cropping out on the side hills, and running at right angles across the creek, granular and fragmentary quartz on the surface, also ironstone and chlorite schist in fine laminæ at the base of the hills. The deposit here is, as at Bendigo, on the ledge, in a ferruginous gravel; specimens Nos. 19 and 20 show the gold in what is here called ironstone; it appears to me to be a conglomerate of quartz crystals cemented together with a ferruginous substance which gave it the appearance of ironstone.

20. I visited some quartz country on Forest Creek, called here the Specimen Hills; the structure is chlorite schist, with countless quartz threads, very rich, running parallel with the schist; specimens Nos. 21 and 22 are from that locality.

21. Freyer's Creek is a tributary water of the Loddon, and geological structure same as Forest Creek; the features for a gold country are very striking; it has been considerably worked, but no doubt will produce ten times more than it ever has done; there are some red hills here similar to the Wentworth Gold Field, which have been worked to good advantage.

22. The head mining station is Castlemaine, situated on Forest Creek, where there is a larger force than at Bendigo, and is the residence of the Chief Commissioner; this station is on a gigantic scale; it is now an assize town; the same good order prevails here as at Bendigo. Mount Byng is of granite formation, and about nine miles from this station.

23. On passing to Ballarat through the Loddon Ranges, the structure of which is schist and quartz, but not at all a decided character for a gold country, several trials have been made; the results, however, have not been sufficiently satisfactory to work them at present. The country changes into a trap at Jim Crow Mountain, and to S.W. is a schist and quartz country. About one hundred persons are at work surfacing with moderate success. From Jim Crow a trap country of a very fine character for fifteen miles, you then come into a schist and granular quartz country, hilly. Digging parties are scattered through these ranges, and at Creswick's Creek a good number, say fifty; you then pass into a flat, and in some places a swampy country; no rocks visible for several miles, and not the slightest appearance of a gold country; yet within four or five miles is the famous Eureka Diggings, which present every appearance of a rich auriferous country. I merely mention this circumstance to show how a place like this might be passed unnoticed, and no doubt many have been; in this instance, however, the range would have directed my attention.

24. The approach to Ballarat is on a slight descent, with numerous trap dykes and granular quartz in immense quantities; in many places for several feet there is nothing else but quartz. The Ureka Diggings are from thirty to seventy-four feet deep, some of which have proved surpassingly rich; the sinking is through a loamy clay. The gold is

deposited on the slate; these diggings are on a range which has evidently been at a much greater height, but now depressed. A little further on towards Ballarat, on the same range, the gold is on the surface, at an elevation of about one hundred feet; then comes the flat and the celebrated Golden Point; this place has proved very rich, and is where the first workings in Victoria were commenced in good earnest; the sinking is through a red clay, and the gold, as at Bendigo, on the ledge; very little has been done here, and a large extent of country remains untouched. These diggings possess a great natural advantage over any others in all Australia, in having, at an elevation of about sixty feet above Golden Point, distant half a mile, a lagoon or swamp ten miles in diameter, where a permanent supply of water can always be had, by regulating the required quantity at pleasure, by means of floodgates: the lagoon is now running over and through the Commissioner's Camp. I therefore consider this locality to be most permanently settled on as a mining district. The features of the country about Bunningyong are of a very striking character, and no doubt will prove good; this field has been very little worked; about five thousand persons are now on it.

25. I need not say how much the gold-deposits differ in localities immediately adjoining; sometimes the gold is at great depths, and at other times on the surface, and at other times disseminated throughout the soil. And with regard to the richness of the mines of Australia Felix, placing them in juxtaposition with our own, the palm must be yielded to the former; but in point of extent we have the advantage, so far as is known at present, and I do not think it good for permanent prosperity that mines should be so rich. These gold-beds of the world—Ballarat, Mount Byng, and Bendigo—have most completely unhinged every industrial pursuit; and money here may be said to have lost its value, or nearly so.

30. From Bunningyong towards Geelong trap alternates with schist and quartz until you get abreast of Warrineep Mountain; from that point to Geelong the whole country is trap and scoriæ, with marl on the banks of the Barwon. This country has evidently been recently upraised by volcanic agency.

31. It now becomes a question in the colony of where is not gold to be found rather than where is it to be found. In Sir Charles Lyell's fourth volume on the Principles of Geology, page 375, this justly distinguished writer says: "If after more fully reflecting upon the various causes of change in the composition and structure of rocks, the reader may conceive the possibility of a very great amount of alteration being induced in the course of time, and may be prepared to conjecture that gneiss and mica schist may be nothing more than micaceous and argillaceous sandstones, and that granular quartz may have been derived from silicious sandstones and compact quartz from the same material, clay slate may be altered shale, and shale appears to be clay which has been subjected to great pressure." Now these theories will inform us that the whole of New South Wales, or nearly so, is auriferous, and I am not at all prepared to doubt it. It is certainly extraordinary that such a vast amount of wealth should have existed in the country so long, and never (except by accident) to have been discovered until the 12th day of February, 1851.

32. I cannot conclude this report without tendering my most sincere thanks to his Excellency the Governor-in-Chief for the opportunity he has so considerately afforded me of visiting the gold-fields of Australia Felix; although no new feature, except the White Hills at Bendigo,

have added to my previous knowledge of gold deposits, yet it has afforded me the sincerest gratification to have seen a field hitherto unprecedented for richness in the history of the world; and I do hope to turn my increased knowledge to the benefit of my own country, as I feel most thoroughly convinced that our present knowledge of gold deposits is very superficial, but by observation and reflection may be reduced into something like a useful shape, which has not yet been done. I have the honour, &c. E. H. HARGRAVES,
Crown Commissioner for the Exploration of the
Gold Districts of New South Wales.

The Select Committee of the Legislative Council of New South Wales, appointed in 1853 to consider the Gold Fields Management Bill, issued a Report dated on the 20th of September of the same year, and alluded as follows to a message previously sent to them from the Governor-General, and which proposed a gratuity of five thousand pounds to Mr Hargraves. I may here explain that when the motion respecting the gratuity was subsequently brought before the whole House, the Colonial Secretary proposed in amendment an increased gratuity of TEN THOUSAND POUNDS, and a grant of that sum was accordingly carried in favour of Mr Hargraves by a large majority of the members.

EXTRACT FROM REPORT.

"As regards the proposed gratuity of 5,000*l.* to Mr Hargraves, on the ground that he was the first discoverer of the auriferous wealth of the colony, your Committee have taken a good deal of evidence, and among other witnesses have examined Mr Hargraves himself, as well as Mr John Lister, who, with Messrs William Tom, junior, and James Tom, have presented a Petition to your Honourable House, setting forth their claim to a participation in this gratuity. The result of this evidence has been to satisfy your Committee that Mr Hargraves returned to the colony from California for the express purpose of searching for gold; that he showed those Petitioners the Californian method of obtaining gold by cradles; that while in the course of this instruction, and in the company of John Lister, he found some minute particles of gold; that shortly after John Lister and James Tom returned to a spot on the Ophir Creek, called FitzRoy Bar, and proved that gold in remunerating quantities could be procured there. Mr Hargraves, however, it is clear, taught them how to find the gold, which they eventually obtained. Your Committee, therefore, approve of the proposed gratuity to him, though they think that the Messrs Lister and Tom are also entitled to a gratuity of 1,000*l.*, which they accordingly recommend should be awarded to them.

"Your Committee, while on the subject of gratuities, feel it due to the Rev. W. B. Clarke to record their high appreciation of the Geological Reports which he has addressed at different times to this Government, and their opinion that the sum of 500*l*., placed on the Supplementary Estimate as an acknowledgment of his services, should be increased to 1,000*l*."

The minutes of evidence upon which this part of the general Report is based will be found republished in full in Appendix K, though it is difficult to find in them any proof of "the express purpose" alleged. These minutes, however, were not seen by me until about two years after their publication, when accidentally I ascertained that a copy might be procured by purchase, at the Government Printing Office in Sydney. On perusal of them, I first became aware of the Colonial Secretary's special pleading and skilful management of the affairs of Mr Hargraves before the Gold Committee. A personal intimacy between them had, however, long been observable, and every one had noticed the earnest advocacy of the former, in the debate on a money gratuity to the Legislative Council. At the time the Report appeared, and before the money grant therein recommended had been submitted to the Legislature, Mr Hargraves argued, in public letters through the press, that he ought in justice to receive a much more considerable remuneration for his services in the gold discoveries, and he several times entreated me to write in the public prints to the same effect. However, I virtually declined doing so, but by way of compromise between advocating his pecuniary interest and as a protest on my own account I gave him the subjoined notes, which were by him appended in the local journals to one of his own public letters.

"1. Blame the Gold Committee for not taking sufficient evidence respecting Mr Hargraves's claim.

"2. The person most thoroughly acquainted with Mr Hargraves's views and motives for leaving California was his partner, Mr Davison, who has never been examined at all.

"3. Had the Committee fully investigated this claim it would have found that his services went beyond that of simply 'returning from California purposely to search for gold;' that he had taken comprehensive views of the difficulties of the Executive Government, and of social derangement; that he had originated the regulations afterwards adopted in Australia for the management of the gold-fields, —all premeditated before leaving California, and the result of much deliberation and consultation with his partner, Mr Davison, before starting on this great enterprise.

"4. That the subject of the propriety of entrusting other persons in the colony with a knowledge of his object when he should proceed to seek for gold had been *fully considered* in California; that the doing so was thought unavoidable; and that his partner, Mr Davison, had *earnestly urged* him to claim the discovery as soon as the smallest quantity of gold could be found by washing, and not to lose time in seeking richer deposits—lest cunning men should forestal him in making the discovery known to the Government. Subsequent events had clearly shown how necessary this step was to prevent the claims of unprincipled pretenders."

The amount of money grant from the colony of New South Wales having now been determined, an application for another gratuity for the gold discovery from the colony of Victoria was drawn up with professional aid, and made, as follows:—

From Mr Hargraves to the Private Secretary to Governor-General Sir Charles Fitz Roy.

Sydney, 9th May, 1853.

Sir,—I have felt called upon to make an application to his Honour the Lieutenant-Governor of Victoria, to bring before the Legislative Council my claim to compensation for my discoveries of gold in the Australian colonies, and I shall feel deeply indebted to his Excellency the Governor-General, if he should think the course unobjectionable, that my application to his Honour the Lieutenant-Governor be forwarded through him. I have the honour, &c.

E. H. Hargraves.

To G. Fitz Roy, Esq., Private Secretary.

Application for Reward from Mr Hargraves to his Excellency the Lieutenant-Governor of Victoria.

Sydney, New South Wales, 9th May, 1853.

Sir,—With a firm reliance on the Government of the Colony of Victoria, I have felt called upon to lay before your Excellency a statement of the circumstances under which I conceive I am entitled to make a claim on that colony, from the benefits it has derived from my discovery of gold in the Australian colonies, and to pray for your recommendation to the Legislative Council that my claim be taken into their consideration.

In making this claim, it will be necessary for me briefly to state the grounds on which I conceive I have a right to bring the subject under the notice of the Government of Victoria.

When the value of my discovery had assumed a character that was calculated very deeply to affect the destiny of the Australian colonies, his Excellency the Governor-General communicated to me his determination to submit my claims to the consideration of her Majesty's Government in England, and he has now communicated to me the substance of a despatch, in which he is directed to submit my claim to the consideration of the Legislative Council.

So far as this colony has been benefited by my discovery, I am not entitled to doubt that the Council will discharge their duty with impartiality both to me and the colony; but it is so obvious that a very large share of the advantages that have resulted from my labours has exclusively benefited the colony of Victoria, that it can hardly be doubted that the Council of this colony will think that the colony of Victoria should bear a fair proportion of any reward my discoveries may be thought to entitle me to receive; and it is difficult to contemplate the rise in the value of land in the city of Melbourne and its neighbourhood, and to read the reports of the shipments of gold to England and New South Wales from that colony, without acknowledging that Victoria has derived a very large proportion of the advantages that have resulted from the discovery. I am unwilling to trouble your Excellency with a history of the labours that have terminated in my discovery, but those labours have, by some persons in this colony, been looked upon with so little consideration, and treated so lightly, that I shall, I trust, be forgiven for a brief notice of them.

When the hope of making the discovery induced me to return from California to Australia, my views and opinions were received with so little favour, that I made my first experiments almost without the barest necessaries, and that exposed in the Bathurst country to the severity of the weather; and when my investigations led me to adopt energetic measures for the prosecution of my labours, I was wholly dependent on funds I had raised after the rate of upwards of cent. per cent., a rate of remuneration thought to be not unreasonable to enable a penniless man to prosecute so laborious and hopeless an inquiry.

We lightly think of the sufferings and privations that have terminated in a successful issue, but it requires no ordinary courage to persevere in an arduous and painful inquiry amidst the fears and discouragements of all those whose judgments and opinions we are bound to respect; as it was, the cold I endured in the Bathurst country laid the foundation of rheumatism, if not neuralgic affections, that make me painfully sensible of every change of weather, and which will, in all probability, accompany me to the grave.

In making this appeal to you, Sir, I speak with the assurance that the investigations you have made, the journeys and personal inspection which a subject of so much importance as the production of gold in the colonies induced you to undertake, peculiarly qualify you to judge of the importance of my discoveries; and I confidently trust that you will feel that the recommendation of my claim to the consideration of the Council of Victoria will be perfectly consistent with your duty as the Representative of her Majesty in that colony.

I have the honour, &c.

EDWARD HAMMOND HARGRAVES.

To his Honour the Lieutenant-Governor
of the Colony of Victoria.

From the COLONIAL SECRETARY of Victoria to MR HARGRAVES.

Colonial Secretary's Office, Melbourne, 21st June, 1853.

SIR,—By desire of his Excellency the Lieutenant-Governor, I have the honour to acquaint you that his Excellency has received a communication from Governor-General Sir Charles Fitz Roy, enclosing a letter from you, stating the circumstances under which you conceive yourself entitled to make a claim upon the Government of Victoria to a gratuity as the discoverer of gold in the Australian colonies.

2. In reply, I am directed by the Lieutenant-Governor to inform you that his Excellency will bring the subject under the consideration of the Legislative Council. I have the honour, &c.

W. LONSDALE.

The application to the Lieutenant-Governor of Victoria shortly produced the following response from the Legislature of that colony:

REPORT OF THE COMMITTEE ON THE CLAIMS TO ORIGINAL DISCOVERY OF THE GOLD-FIELDS OF VICTORIA.

The Committee appointed to consider the propriety of requesting his Excellency the Lieutenant-Governor to take such steps as may enable the Council to mark in a substantial manner their high appreciation of the services rendered by Mr E. H. Hargraves to this colony, by the discovery of gold-fields in the continent of Australia, and also what other persons are entitled to reward for the discovery of the Victorian gold-fields, have agreed to the following Report:—

After giving every possible publicity to their intended investigation, and requesting, by public advertisements, all persons concerned to attend or communicate with your Committee, they proceeded to take the evidence of such persons as presented themselves, and took into consideration the various documents referred to them by your honourable House, the Report of the Committee of the Legislative Council of New South Wales on the subject of Mr Hargraves, and a large mass of correspondence relative to the claims of the Rev. W. B. Clarke, Don Louis de Boliva, and others.

In dealing with this subject, your Committee cannot but draw some distinction between scientific and practical discovery, for although the former would, in reality, have been equally as beneficial as the latter, had the colonists been as ready to trust to the scientific theories of the scholar as they were to the tangible demonstrations of the actual digger, yet, seeing what has been the result of the Rev. W. B. Clarke's discovery in 1841, as compared with that of Mr Hargraves in 1851, your Committee feel called upon to recommend a more substantial reward to the one than they can do to the other; at the same time they admit the higher claims to honour and public consideration that the scientific explorer possesses. It appears from the evidence given by the Rev. W. B. Clarke, before the Select Committee of the Legislative Council of New South Wales, that as far back as 1841 he discovered gold in the mountainous country to the west of the Vale of Clwyd;—that in 1843 he spoke to many persons of the abundance of gold likely to be found in Australia;—that in 1844 he exhibited a sample of gold in quartz to the then Governor, the late Sir George Gipps; to the late Mr Robinson, then member of the Legislative Council for Port Phillip; to Mr Justice Therry, and to several other persons; but that the subject was not followed up, "as much from considerations of the penal character of the colony as from the general ignorance of the value of such an indication." Thus, it appears, that the Rev. W. B. Clarke did all in his power to make his discovery serviceable to a country not then in a position to make that discovery available; and your Committee, therefore, feel bound to recognise his claim to be considered the first discoverer of gold in Australia. The changed condition of the sister colony when Mr Hargraves washed the first gold on the Summer Hill Creek, aided by the knowledge of the mode of proceeding necessary to obtain the precious metal, acquired in California, put the discovery of Mr Hargraves on a far more advantageous footing than that of Mr Clarke, which, owing its origin to scientific research and analogical reasoning, could not be expected to make so strong an impression on the public mind as the palpable, practicable, and easily understood demonstrations of the former gentleman.

With reference to the discovery of the Victorian gold-fields, your Committee would recur to the early portion of the year 1851, after the discovery of the Bathurst and Turon workings in the northern portion of the great Australian Range. The not unfounded apprehensions of at least a temporary depression from the draining off of our population to the northern district, caused a committee to be formed in this city to promote the discovery of a gold-field in Victoria. The knowledge that the dividing range of this colony is a continuation of that of New South Wales, and that the general features of this country resembled in many parts the auriferous districts of the former, induced a strong and prevalent impression that extensive gold deposits were to be found in Victoria; an impression which was strengthened by the fact of the production five years before of a large mass of gold ascertained to have been procured in the Pyrenees district.

It is therefore not surprising that such excitement on the subject prevailed at this period, and that several persons simultaneously commenced to search for gold in several localities.

It appears that in the month of March, 1850, the honourable member for the Loddon, Mr W. Campbell, of Strath Loddon, discovered on the station of Mr Donald Cameron, of Clunes, in company with that gentleman, his superintendent, and a friend, several minute pieces of native gold in quartz. The circumstance was avowedly concealed at the time, from an apprehension that its announcement would prove injurious to Mr Cameron's run. Observing, however, the migration of the population of New South Wales and the panic created throughout the whole colony, and especially in Melbourne, on the 10th of June, 1851, Mr Campbell addressed a letter to Mr James Graham, M.L.C., stating that within a radius of fifteen miles of Burn Bank, on another party's station, he had procured specimens of gold.

A party formed by Mr Louis John Michel, consisting of himself, Mr William Haberlin, James Furnival, James Melville, James Headon, and B. Gruenig, discovered the existence of gold in the quartz rocks of the Yarra Ranges, at Anderson's Creek, in the latter part of June, and showed it on the spot to Dr Webb Richmond, on behalf of the Gold Discovery Committee on the 5th July. They communicated the full particulars of the locality to his Excellency the Lieutenant-Governor on the 8th, and on the 16th they brought to town, and exhibited to the Gold Discovery Committee above mentioned, a sample of gold procured by washing the alluvial soil in the same neighbourhood at Anderson's Creek.

About the same time, Mr James Esmonds, who had returned two months previously from the Californian diggings, on the completion of an engagement, set out in the search along with Messrs Pugh, Burns, and Kelly, and obtained gold in the quartz rocks of the Pyrenees, near Mr Donald Cameron's station. This was exhibited by Mr Esmonds, at Geelong, to Mr Clarke and Mr Patterson, on the 5th July, and the general fact of the discovery of gold at the Pyrenees was published in the 'Geelong Advertiser' of the 7th, and the particulars of the precise locality, with Mr Esmonds's consent, on the 22nd July. On the 10th of the following month (August) Mr Patterson received a sample of gold from Mr Esmonds, the produce of the cradle, from the same locality, since called the Clunes diggings.

Dr George H. Bruhn, a German physician, in the month of January, 1851 (*i.e.*, before Mr Hargraves's discovery at Summerhill), started from Melbourne to explore the mineral resources of this colony. During his lengthened tour he found, in April, indications of gold in quartz about two miles from Mr Parker's station, and on arriving at Mr Cameron's station was shown by that gentleman specimens of gold at what are now called the Clunes diggings. This information he promulgated through the country in the course of his journey, and communicated to Mr James Esmonds, at that time engaged in erecting a building at Mr James Hodgkinson's station. Dr Bruhn forwarded specimens, which were received by the Gold Discovery Committee on the 30th June, 1851.

The precise locality of Mr Esmonds's discovery was not made known until the 22nd, whilst Mr Campbell and Mr Michel divulged the precise spot on the 5th; but it appears in evidence that previous to the former gentleman making the exact spot known, Mr Esmonds's party were actually at work upon it. Mr Michel and his party have therefore, in the opinion of your Committee, clearly established their claim to be held as first publishers of the discovery of a gold-field in the colony of Victoria; the situation of their works being shown publicly on the 5th of July, and full particulars communicated to the Government on the 8th, and licenses to dig for gold there were issued shortly after, viz., on the 1st September, which was previous to their issue on any other gold-field; and about three hundred persons were at work when Balaarat was discovered.

At each of these diggings workings were carried on with more or less success by a considerable number of diggers. Probably from want of practical experience rather than of good auriferous soil, it appears that not many were particularly fortunate; but the workings were still in active operation at both places when the extraordinary attractions of Balaarat rapidly drew them off to its prolific deposits.

Mr Thomas Hiscock, a resident at Buninyong, induced by the writings of the Rev. W. B. Clarke, and by the discovery of Brentani's nugget in the Pyrenees district five years before, had kept a constant look out for gold in his neighbourhood. It does not seem that he was possessed of either scientific or practical knowledge of the subject; but he discovered an auriferous deposit in the gully of the Buninyong Ranges now bearing his name, on the 8th August, and he communicated the fact, with its precise locality, to the editor of the 'Geelong Advertiser' on the 10th of that month,—the same day as Mr Patterson, of Geelong, received from Mr Esmonds the first actual produce of the Clunes diggings. It does not appear that there was any knowledge whatever by these parties of each other's commencing the search for gold.

It is obvious that Mr Hiscock's discovery, at Buninyong, by attracting great numbers of diggers to the neighbourhood, was the cause of the discovery of Balaarat. Balaarat is, in fact, upon the same range, and at no great distance, about six or seven miles. The discovery of the Golden Point at Balaarat is claimed by two parties, both of whom went first to Hiscock's diggings, and then extended their searches, one on one side, the other on the other side of that grand focus of attraction. Where so many rich deposits were discovered almost simultaneously, within a radius of little more than half a mile, it is difficult to decide to whom is due the actual commencement of the Balaarat diggings. It is, however, clear that Mr Brown and his party were working, during the first days of September, on one side, and Messrs Regan and Dunlop on the other side of the ranges forming Golden Point. But it must be observed that these, and the numerous other parties who by this time were searching the whole country for gold, had been attracted there by the discoveries in the neighbourhood of Messrs Esmonds and Hiscock, and that, in the language of a disinterested witness, Mr Alfred Clarke, of Geelong, "the discovery of Balaarat was but a natural consequence of the discovery of Buninyong."

Your Committee scarcely consider it within the scope of their instructions to pursue the subject of subsequent discoveries. But the prolific deposits of Mount Alexander render it interesting to record that the honour of first finding gold there is claimed by Christopher Thomas Peters, then a hut-keeper at Barker's Creek, in the service of William Barker, Esq., on the 20th July, at Specimen Gully. John Worley, George Robinson, and Robert Keen, all in the same employment, were immediately associated with him in working the deposits, which they continued to do, with more or less privacy, during the whole of the following month. On the 1st of September, having become alarmed at their unauthorised appropriation of their produce, Worley, on behalf of the party, "to prevent them getting into trouble," published in one of the Melbourne journals an announcement of the precise situation of their workings. With this obscure notice, rendered still more so by the locality being described by the journalist as "at Western Port," were ushered to the world the inexhaustible treasures of Mount Alexander.

Having thus reported upon the discovery of the gold-fields of Victoria, your Committee turn to the petition of Mr E. H. Hargraves, soliciting an acknowledgment of his services in having first demonstrated the existence of profitable gold-fields in the continent of Australia. Your Committee consider that the report and evidence of the Committee of the honourable the Legislative Council of New South Wales, received and adopted by that honourable House, is to be taken as sufficient evidence of the fact that Mr Hargraves returned to the colony from California for the express purpose of searching for gold, that he communicated his views and intentions to the Government and others, that he succeeded in discovering gold-deposits, and taught parties how to construct and use the apparatus required.

It is also ascertained that he did this with little assistance beyond his own limited means, without any stipulation for his own advantage; and it is known that since success has shown the soundness of his views as to the richness of the gold-fields of Australia, he has steadily refused many valuable opportunities of remunerating avocations, trusting for his reward to the honour of the Government and the gratitude of his fellow-colonists.

To say that Mr Hargraves's discoveries led to the discovery of the gold-fields of Victoria is merely another mode of stating that the great dividing range, which stretches from one colony to another, is rich in auriferous deposits. Without doubt, on the first discovery of the northern diggings, a considerable number of our labouring population was drawn thither; but the infinitely greater evil of emigration to California was stopped at once. Nor is it probable that the migration to the Sydney district would have been more than temporary, even had the Victorian diggings not been discovered, for it does not appear that either Tasmania or South Australia complain of their proximity to the mineral riches of Victoria.

Your Committee are therefore of opinion that the person who has opened out to us the road to our apparently exhaustless treasures, with a noble disinterestedness unexampled in history, should receive a liberal reward. Considering that the gold discovery has advanced this colony a century in progress, has placed it first in position of all the Australian colonies, and materially benefited it much more than New South Wales, your Committee recommend that the sum of 5,000*l.* should be presented to Mr Hargraves, and that the sum of 1,000*l.* should be awarded to the Rev. W. B. Clarke, in appreciation of his researches into the mineral wealth of the country.

With regard to the discovery of the Victorian gold-fields, your Committee consider that the honour must be shared amongst all the parties already enumerated.

It will be seen that on the 10th of June, Mr Campbell communicated the general fact of his having discovered gold in the Pyrenees district to Mr Graham, but that it was not till the 5th of July that this fact, together with the exact locality, was made known by the former, in a letter of that date, addressed to the latter. On the same day (July 5) Mr Michel actually showed the locality of his discovery to Dr Richmond, as a member of the Gold Discovery Committee. The Clunes discovery was also made known, at Geelong, by Mr Esmonds on the same day, and the information of it was generally diffused by Dr Bruhn in his tour through the interior. Mr Hiscock's discovery, though later in date, was of so superior a value, since it at once led to the revealing the treasures of Balaarat, and the turning the tide of popular migration to our own borders, that your Committee consider him entitled to be placed in the foremost rank of our gold discoverers.

Your Committee, therefore, recommend that to Mr Michel and his party, as having, at considerable expense, succeeded in discovering and publishing an available gold-field, the sum of 1,000*l.* should be given; to Mr Hiscock, as the substantial discoverer of the Balaarat deposits, a like sum of 1,000*l.*; to Mr Campbell, as without doubt the original discoverer of the Clunes, a like sum of 1,000*l.*; to Mr Esmonds, as the first actual producer of alluvial gold for the market, a like sum of 1,000*l.*; and to Dr Bruhn, as an acknowledgment of his services in exploring the country for five or six months, and diffusing the information of the discovery of gold, the sum of 500*l.*

In closing their Report, your Committee would observe that their sittings have been protracted to an unusual length through their anxiety to examine thoroughly a very complicated subject, involving many conflicting claims, by means of evidence difficult of access and frequently of an imperfect character. They have been solicitous, also, not only to do justice to the rival pretensions of claimants, but to form an accurate record of this interesting portion of the history of Victoria.

The discovery of the Victorian gold-fields has converted a remote dependency into a country of world-wide fame; it has attracted a population, extraordinary in number, with unprecedented rapidity; it has enhanced the value of property to an enormous extent; it has made this the richest country in the world; and, in less than three years, it has done for this colony the work of an age, and made its impulses felt in the most distant regions of the earth.

(Signed) A. F. A. Greeves, Chairman.

Upon the appearance of the foregoing Report, Mr Hargraves addressed the colonists of Victoria through the Sydney journals, and adopting the language of the Committee in "considering that Victoria had been much more materially benefited by the gold discovery than New South Wales," he urged that, therefore, the former ought to assign to him the much larger reward. Since the one had already voted him ten thousand pounds, the other ought, at least, he implied, to grant him thirty thousand, to equal the generosity of the less benefited colony. The alleged publicity of invitation for all parties concerned in the intended investigation to communicate with this Committee must have been a very local advertisement, since I never so much as heard of it; and with the fact before them, that at the first interview with the Colonial Secretary a promise of reward in money, proportionate to the magnitude of the importance of the discovery, had been expressly given to Mr Hargraves, and ten thousand pounds already granted on account, it is difficult to comprehend how the Committee could declare that, "without any stipulation for his own advantage, Mr Hargraves had made the discovery known with a noble disinterestedness unexampled in history." The chairman, Dr Greeves, in a subsequent debate, logically demonstrated that "discovery has no parts," and that just as Columbus, by discovering a part of America, had discovered the whole, so had Mr Hargraves discovered all the gold in Australia: If the sophistry had any force at all, one might suppose that of the two (when setting theory aside) it applied more literally to the Rev. Mr Clarke. The public treasury being low at this time, the question of gratuity stood over until the succeeding session, when five thousand pounds only was voted by the Legislature for division amongst all the enumerated gold-discoverers except Mr Campbell;—the Executive Government of Victoria finally awarding one half of the sum to Mr Hargraves.

Part Second.

A NEW THEORY.

"In primis hominis est propriâ *veri* inquisitio atque investigatio."

A PURELY philosophical argument, arranged in the form of a complete theory, may perhaps, to the general reader, be of less interest than when in substance it is discussed with more animation in subsequent pages, yet, since the two first public letters contain the rough outlines of succeeding epistolary essays, they are here epitomised to preserve the serial order. Citations of high authority on general principles in geology, chemistry, and physics are now adduced in further support of the general theory. Many of the stated facts relating to the physical condition of gold deposits were, however, in the first instance, given by me *ex cathedrâ*, and necessarily rested upon my own authority, since no previous writer that I am aware of had ever possessed on this particular subject the same amount of personal experience and empirical knowledge as I had then acquired.

The task of popularly broaching a new theory upon any abstraction in physics or philosophy, when authorities by whom the world expects to be guided in its opinion—the men of science and other public leaders,—are themselves unconscious of the amount of their own deficiency in data, is a task of no ordinary difficulty. Even the very attempt to teach scientific men or others in position of public trust, without being already a recognised member of their exclusive body, is too often only to array their influence against the individual who, from any fortuitous circumstances, may by some side path have advanced beyond their special acquirements or discovered the fallacy of their self-satisfied pretensions. It has been well said, that all men are ignorant, and differ from each other in ignorance but in degree and kind. That the philosopher Galileo should not only have dared to declare the discovery of important physical truths, but should also have been able mathematically and experimentally to demonstrate their infallibility, did not except him from the category of those who experience the mortification of having discovered forbidden truths or advanced new doctrines distasteful or inconvenient to those invested with brief and prejudicial authority. An entirely unguided populace, it must however be owned, is sometimes no less indiscreet, since the eminent Dr Harvey is alleged to have entirely lost his medical practice because of his having discovered and propounded the theory of the circulation of the blood.

When called upon by Mr Hargraves to commit to paper my theoretical views on gold deposits, as I had previously expressed them to him orally, in order that he might have the advantage of them when about to appear in England as the Government-recognised Gold-discoverer of Australia, I felt exceedingly diffident in essaying to write theoretically on a subject with which I was, nevertheless, practically quite conversant; for, independently of deficiency in early scientific training, many of my later years had been passed in the semi-barbarism of bush life, entirely absent from literature and other means of acquiring passing information on current scientific topics. These disadvantages in a measure disqualified me from giving adequate expression to the information which I wished to convey, yet it must be admitted that the very absence from civilisation which had rendered me deficient in one sense had enabled me to collect on the great field of nature those numerous and hitherto unknown or rarely noticed facts which negatived preexisting hypotheses on the one hand and supplied me with valuable data on the other.

I had in my experience undoubtedly collected a vast number of essential facts respecting gold-deposits, and acquired a large amount of knowledge at the very best source, namely, from Nature herself—while it had been my repeated endeavour to integrate the whole into one comprehensive theory, so that, notwithstanding some diffidence, I rejoiced at the opportunity now afforded of contributing those important new facts to the sum of human knowledge.

"All are agreed in these days," observes M. Auguste Comte, in his 'Philosophy of the Sciences,' "that real knowledge must be founded on the observation of *facts*. Hence contempt of mere theories. But no science could have its origin in simple observation; for if, on the one hand, all positive theories must be founded on observation, so, on the other, it is equally necessary to have some sort of theory before we address ourselves to the task of steady observation. If in contemplating phenomena we do not connect them with principle, it would not only be impossible for us to combine our isolated observations, and consequently to draw any benefit from them, but we should also be unable to retain them, and most frequently the important facts would remain unperceived. We are consequently forced to theorize. A theory is necessary to observation, and a correct theory to correct observation." * * * * "Newton's assertion, *Hypotheses non fingo* (I make no hypotheses), has been incessantly repeated by men who fancy themselves Baconian thinkers when they restrict their incompetence to what they call *facts*. No reader of these pages need be told that such ideas of science are utterly irrational. Newton himself gives it no countenance. His own great discovery was an hypothesis at first, and only became a theory after verification. Kepler made nineteen hypotheses respecting the form of the planetary orbits, and abandoned them one by one till he settled on the elliptical form, which, on verification, proved correct, and *then* was no longer an hypothesis."

The hypothesis of the origination of alluvial gold by abrasion had already been very much encouraged by scientific authority, and to some extent it had been popularly received, yet my experience did not verify it. The counter hypothesis, or theory, which I have advanced in these two letters is, therefore, submitted as meeting all the facts more completely. Scientific and philosophical inquirers, besides the practical gold-miners, are the persons chiefly addressed in this part rather than the general reader, who may be unable to give due weight to the fundamental facts and principles which it sets forth.

Before attempting to complete a new theory, I had had, in addition to my own experience, the advantage of cursorily reading several geological reports from the gold districts of Australia by the Rev. Mr Clarke, and of perusing one short report from Mr Selwyn, the newly-appointed Government geologist in Victoria, besides having had one opportunity of referring to the work on 'Russia and the Ural' by Sir Roderick

Murchison, as well as of reading the 'Lectures on Gold' given in London at the Museum of Practical Geology.

The result of these references was to convince me that the knowledge of most of these authorities was very limited indeed as far as related to alluvial gold. Their speculations did not appear, for the most part, to have advanced beyond the stage at which my inquiries had begun; the tenor of their observations being invariably to the effect that, by unknown and inexplicable means, visible gold had been first produced in quartz-veins, and that thence, by means perfectly well known and demonstrable, the metal had been released from them and lodged in depressions by aqueous means at the bottom of alluvia and drift. The Rev. Mr Clarke's later field examinations for the Government had been made chiefly upon granites, and therefore many of his speculations related more to the release, by similar means, of visible gold from a supposed matrix of granite. The manner in which the release of alluvial gold from quartz was supposed to have been effected is graphically given in a popular way in the 'Lectures on Gold' by Professor Jukes; and to give the whole passage will afford an excellent idea of the then prevalent notion among men of science. The lecturer, after describing how igneous rocks have been originally formed, and how their protrusion had altered and transformed aqueous rocks into metamorphic rocks, proceeds to say (page 7):—

> As the igneous rocks cooled, moreover, they themselves cracked, or were acted upon by subsequent disturbing forces, which caused fissures to run through them as well as the surrounding aqueous rocks. All these fissures, or veins, have since been filled (we have no time to attempt to explain how) by minerals in a more or less pure or unmixed state, and frequently in a crystalline form. Of these minerals quartz is probably the most abundant. Quartz is usually a white compact stone, but sometimes forms long finger-like transparent crystals, and is then called "rock crystal." It may be called "pure flint."
>
> Besides quartz, however, many other minerals accumulated in these veins, and among them many metals, such as lead, tin, copper, silver, and gold. The other metals are rarely found pure, but occur as ores, combined with other substances, in such a manner that they often lose all their metallic appearance, and can only be recognised by the practised or scientific eye. Gold, however, most frequently occurs pure, or at all events so nearly so that its metallic nature can be at once recognised. It occurs in these quartz-veins either in crystals or in rudely-shaped lumps and masses, or in small flakes and grains, and sometimes is diffused through the mass of the quartz in such a minute state of subdivision as to be quite imperceptible to the eye, although in such quantity as to be very profitable to the miner.
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> The metals mentioned above, then, usually occur in narrow, more or less upright, veins, which are nothing more than comparatively small cracks or fissures traversing the whole mass of rock in which they are

found. These veins are rarely more than a few feet, sometimes only a few inches wide.

The metals are not entirely confined to such veins, as sometimes they are found in strings or nests, or irregular masses, in the body of the rock, or disseminated through it in a state of fine subdivision. It is very rarely, however, that any considerable quantity of gold or other metal is thus found dispersed in the body of a rock.

There is one other general geological subject I must briefly lay before you, and that is the formation of drift-gravel, sand, or clay—those loose unconsolidated materials which are so commonly found lying between the vegetable mould and the main body of the solid rock.

It is well known that not only have all the stratified rocks, comprising the far greater portion of the globe, been formed under water, principally the sea, but also that since their formation they have been raised into dry land, again depressed beneath the sea, and again re-elevated, and this process repeated perhaps many times. This alternate elevation and depression of the land has, moreover, taken place more or less quietly and gradually, the result of which is, that every portion, nay every square inch of dry land, has passed through the influence of tides and currents, and breakers, and all that destructive action which we now see taking place along our own coasts daily. The result of this is, that the last time the land slowly emerged from the sea, the breakers, the waves, and the currents, knocked off fragments of rock, washed and rolled them, and swept them about until they had rounded them into pebbles or boulders, pounded them into sand, or ground them down into mud or clay. These clays, sands, and gravels, the washings of the rocks, have finally been left lying about in patches here or there, or spreading over more or less of the surface, sometimes covering large tracts, both high and low, sometimes accumulated only in hollows or pre-existing valleys and depression. When the waters in which these superficial accumulations were deposited *acted on rocks containing gold, whether the gold were disseminated through the mass of the rock or confined to the quartz-veins traversing it*, fragments of the auriferous rock would of course be detached equally with pieces of all other rocks. These fragments, either slightly water-worn or altogether broken and ground down, would afterwards be found in the drift clays, sands, and gravels.

Now, after giving the above lucid description of the power of the sea to detach the fragments of the auriferous rock, and release the gold from its stony matrix (such fragments of gold-bearing rocks never, however, being found in the older drifts, nor even in the auriferous drifts except as rare curiosities), the lecturer continues to observe, that

Sir Roderick Murchison, in his account of the auriferous chain of the Ural, has remarked that the gold there must be of comparatively recent geological origin, and that it is newer than any rock or earthy deposit in the country except the drift. It is most probable, therefore, says the lecturer, in quoting Murchison, that there was no gold in the Ural during the period of their deposition, and that the gold was only deposited in the veins of the Ural rocks just previously to the formation of the drift.

It appears, then, from this reasoning, that all the aforesaid pounding requisite to detach and release the recently originated gold must have been done, if ever so done at all, upon the one occasion when the whole emerged from the sea.

Many persons, who vaguely favour the doctrine of abrasion to account for the origin of placer deposit gold, often overlook the important question—whether or no there is any distinct evidence that the land really did emerge from the sea at all during the geologically recent time when the auriferous drift was in course of being deposited. The Rev. Mr Clarke, however, without the satisfactory proof which the testimony of fossils affords, seems disposed to favour the idea that gold has been originally formed under the ocean in vein-stones, and thence released and dispersed by ocean waters; but then this geologist conjectures that some of the auriferous impregnations and deposits occurred during the *carboniferous epoch* (differing in this respect from the opinion of Murchison), notwithstanding that no fossil-bearing carboniferous deposits have ever yet been found spread over the horizontal beds of placer deposit gold. The Rev. Mr Clarke's hypotheses on this subject may be read in APPENDIX D.

Now it had always seemed to me very strange that if the gold containing drift had been deposited beneath the ocean, and if the metallic grains had been chiefly released from their stony matrices by breakers, waves, and currents, as the land slowly emerged from the sea, at any geological period whatever, that I should never in all my gold-mining experience have met with any single instance of coeval marine remains upon any of the gold-fields. There is not a bone, nor a tooth, nor a shell, nor a dermal plate of any coeval marine organism in any auriferous drift that I have ever seen. Surely this negative evidence is very weighty. Neither do I find that any of those geologists who have surmised that a disintegration of the metal in alluvia has been effected by a pounding of the rocks on an ocean margin in a late epoch—just before the formation of the drift, or at any other geological time—had themselves ever substantiated the conjecture of the deposition of the auriferous drift at the bottom of the sea by finding marine remains. There are in fact at the gold-fields neither neighbouring raised sea-beaches nor hollows containing salt-water shells, like the London and Paris tertiary basins, nor indeed any fossil-bearing strata with marine remains of any kind, either intermingled with or superimposed directly over any known horizontal deposits of gold which I have ever observed, or heard of or read of. The only fossils which have been found in the auriferous gravels are the bones of mammals, chiefly of elephants and rhinoceroses, and not the bones of animals which have lived in the ocean. Even beyond the immediate limits of any of the notably rich beds of alluvial gold, none of the present surfaces of the districts themselves taken in larger areas, and including the auriferous deposits, are recently elevated sea-bottoms, if the existence of marine exuviæ is to be considered the proof. There would no doubt be coeval marine deposits if the land had really been elevated from under the sea after the subjacent and tilted fossil-bearing strata had been consolidated, and when the gold-containing drift was in course of formation. The conjecture of the formation of the alluvial gold deposits by the slow emergence of the land is not in truth supported by any collateral evidence that the land has emerged from the sea at all during the period of their deposition. The dispersion of gold along very small channels now occupied by running waters of feeble power, to which the Rev. Mr Clarke alludes in the extracts just named, is also another phenomenon which had already often struck me as being quite irreconcilable with the origination of alluvial gold by an aqueous destruction of gold-containing quartz, either before or after any supposed elevation of the land above the sea.

But that the metal in alluvia had been released by pounding from stony and solid rocks, I found on reference that few previous writers appeared in the least to doubt, while the existence of the fact that the metallic grains beneath alluvia are in shape conformable to the bed rock, that leading and very important fact which had been so much the basis of my speculations in California, seemed to be utterly unknown to any one man of science who had ever written on the subject of gold.

Sir Roderick Murchison thus observes of gold in his recent work called 'Siluria,' all his speculations referring to the mechanical release of gold previously formed in stony matrices:

> Whatever may be the correct hypothesis as to the original mode of formation, the fact is undeniable that wherever the veinstones in the solid rock *have not been ground down by former powerful denudation*, but remain as partial testimonials of the origin of gold, the portions which have as yet proved to be the richest are those which are at or near the surface, &c.

And in another place he adds:

> The points which have been alluded to as drawn from personal observation on the Ural Mountains are found to have a world-wide application in every tract which has been or is still auriferous.

It afforded me, however, much gratification on first ascertaining that so high an authority in geology as Sir Roderick

Impey Murchison, a man of science thoroughly skilled in the particular science of Palæontology, and the author of a system which corroborates upon fossiliferous data the cosmological doctrine of secular refrigeration—should, upon examination of the evidence which organic remains afford with respect to the geological age of gold, have so distinctly arrived at the conclusion that the impregnation of the very ancient rocks with gold must have taken place at a very recent geological date, and that he cannot believe "that it occurred shortly after the Permian era, nor even when any of the secondary rocks were forming, since no golden debris is found even in any of the older tertiary grits and sands which occur on the Siberian flank of the Uralian chain." "If then," he argues, "the mammoth drift be the oldest mass of detritus in which gold occurs abundantly, not only in the Ural, but in many parts of the world, we are led to believe that this noble metal, though for the most part formed in ancient crystalline rocks, or in the igneous rocks which penetrated them, was only abundantly imparted to them at a comparatively recent period; *i.e.* a short time (in geological language) before the epoch when the very powerful and general denudations took place which destroyed the large extinct mammalia."

And then again, I was glad to find that both Sir Roderick Murchison and the Rev. Mr Clarke should have admitted upon evidences in physical geology, that the auriferous quartz veins had been probably fitted with quartz by *volcanic agency*, even when neither of them knew that in nature the alluvial gold deposits themselves offered quite distinct evidence that the metal had been deposited in a soft or liquid state. The recorded opinions of both these authorities inspired me with a good deal of confidence in framing a complete theory, which should connect my ideas of the formation of alluvial gold deposits with their opinions of the volcanic origin of gold in veinstones, and I perceived that the two theories were not essentially contradictory, for my scepticism had only related to the supposed derivation of placer deposit gold from the pounding of auriferous quartz-rock; and while so many men of science regarded the infilling of cracks and faults in rocks with metallic matter as being due to some slowly operating electrical process analogous to the art of electrotyping, it was highly satisfactory to find these authorities ascribing the infilling of auriferous quartz-veins to direct volcanic agency, however much in my opinion they might err in attributing the presence of gold in placer deposits to a mechanical destruction of such veinstones.

And further, it was satisfactory to note that Sir Roderick Murchison should indorse Humboldt's suggestion, and believe that gold had *some closer relation to or dependence upon the atmosphere* than the baser metals, lead, copper, and iron.

But while both Sir Roderick and the Rev. Mr Clarke concluded that the auriferous quartz-veins might have been cracks infilled with matter by volcanic agency, they both supposed aqueous vapour to have been the means of conveying the matter into them. Now such an agent is incompatible under ordinary circumstances with the presence of softened or molten gold; and although, under enormous pressure, it is philosophically considered to be not altogether impossible to heat steam or aqueous vapour to incandescence, yet no such pressure appears probable in the case of the auriferous veinstones, especially of veinstones infilled at a late period, and not apparently even under the weight of an ocean. But since my own theoretical speculations had been chiefly made with respect to placer deposits, and upon the great facts of the gold grains and nuggets being in shape conformable to the bed-rock, and in many instances of their presenting the appearance of having been fused on the floor, and very frequently yet remaining entirely unabraded, I was led quite naturally to the conclusion that the medium of conveyance must have been some *liquid matter* of a perishable nature in a state of incandescence, and that the same agent would apply equally well to the auriferous quartz-veins as to the placer deposits which I had chiefly studied. Being impressed then with these views, I addressed to Mr Hargraves two epistolary essays for publication in a local newspaper in exposition of my theory, and although there may be reason to doubt the recent geological age of gold—that question need not be entered upon here, since I think it explicable without affecting the main argument. The opinion of Murchison, framed on the fossiliferous evidence as to there being no gold dispersed amongst the stratified and fossil-bearing debris and conglomerates deposited during the primary, secondary, and early tertiary epochs, served the temporary purpose of confirming the independent opinions which I had formed upon my own observations, and which were not based upon the testimony derivable from marine fossils, simply because there were no coeval marine fossils in any of the notably rich gold-beds which had come under my examination.

In the FIRST PUBLIC LETTER addressed to Mr Hargraves, and published in the Sydney 'Empire,' on THE ORIGIN OF GOLD, after premising that his indifference to geology had left him unbiassed by any prejudices which could not be sustained by an appeal to evidences in nature, I proposed to repeat to him in writing the principles which I had previously explained orally, since almost all men engaged either in practical gold-digging or in the scientific study of geology did form some conjecture as to the origin of the precious metal, although with nearly equal unsatisfactory results. Stating, then, that I had carefully endeavoured during my observations to avoid forming hasty conclusions, and had at various times rejected different crude hypotheses, yet nevertheless had always reflected upon and considered the subject, more or less, both when occupied in mining and when travelling over auriferous areas, and that having already visited the principal diggings in California, Victoria, and New South Wales, and being already acquainted with the general principles of geology, I felt conscious of possessing advantages in treating of the subject such as but few men had heretofore enjoyed.

That Sir Roderick Murchison having advanced an hypothesis that alluvial gold had chiefly been produced by "the natural abrasion or grinding down of quartz-veins," almost every geologist, writer, lecturer, and newspaper correspondent had adopted the same conclusion, upon his individual authority, without themselves entering upon inquiry and investigation; therefore I could only regard the conclusion as an individual opinion, notwithstanding so formidable a numerical array of supporters, and was decidedly of opinion such a postulate was not universally true, and consequently would now state my reasons for a different conclusion.

The alleged discovery of Sir Roderick Murchison, that the gold in Russia was only deposited *in the veins* of the Ural rocks just previously to the formation of the auriferous drift, and that this drift is nearer in geological sequence than the sands and gravels of either the primary or secondary and tertiary deposits, appeared of itself unfavourable to the supposition that so very hard a rock as quartz could have been abraded and ground down in so comparatively short a geological time; but admitting the premises of a late formation of the quartz-veins, it still seemed probable that alluvial or placer deposit gold had been derived from some softer matrix than quartz-rock.

The theory I advanced then was—that *alluvial or placer deposit gold has been distributed and deposited horizontally by means of an igneous liquid or perishable lava, and that quartz-veins as well as some other dykes traversing constants had been the fissures of discharge*—the only unchanged existing solid remains of the ejected matter being gold, quartz, and some few other minerals, besides clays and ferruginous earths—because

1. Alluvial or placer deposit gold has often a fused appearance, and the metallic grains frequently present ragged and irregular surfaces, such as must have been destroyed by abrasion.

2. It is found upon slaty and schistose bedding rocks in such shape and position that no merely mechanical force could possibly have so placed it.

3. It is found abundantly deposited along present rivers, creeks, and watercourses, and its deposition in these places indicates the configuration of the bedding rock beneath the auriferous drift to have been nearly the same at the time of its deposit as at the present day.

4. It is found richly deposited in the neighbourhood of ancient volcanic disturbance, and where quartz-veins and trap-dykes traverse certain slates, schists, and granites called constants.

5. Gold is also found encased and enveloped within a stony matrix of quartz in veins, and quartz-veins are admitted by high geological authorities to have been filled from below by mineral matter in a fluid or vaporous state.

In support of these propositions I recalled to his memory several particular instances of the metal being moulded upon the floor, and the generally flat character of the gold on Wood's Creek, where I had obtained from him the admission that my conjecture appeared probable, when affirming that the corresponding flat character of the alluvial metal with that of the subordinate slate suggested some unknown and undiscovered relation existing between them, and reminding him of my experiments and discussion with Mr Rudder on the subject of gold in granite on the Yuba River, when I had satisfactorily discovered that the metal was not *within* granites but only *upon* them, precisely as it was upon the slates where the conformability of its shape to the bed rock was more apparent.

Stating also an instance in my experience of a tripartite nugget of gold, three ounces in weight, found in alluvia and not near any known auriferous quartz-vein, the three parts of which were exactly conformable to each other, and yet not attached, besides other instances at the White Hills of Bendigo, where the gold grains being very small, I had dug up in the richer patches slightly cemented accumulations of grains, weighing collectively two or three pennyweights, in the centre of which were pieces of gold, each about the size of a pea, exactly and deeply indented by the surrounding grains; both cases, as

I inferred, indicating the deposition of the metal at the particular temperature, when the several pieces of metal were soft enough to reciprocate impressions without being so completely in liquid fusion as to cause their coalescence.

A certain methodical arrangement of the golden particles in the auriferous pebbles of New Zealand, which differed from any I had seen elsewhere, also indicated, as I thought, their solidification in an isolated state, and not their origin by mechanical detachment from veinstones.

Referring likewise to my experience at Mokelumne Hill, where the placer deposits in certain channels, or leads, rested beneath a soft white felspathic tufa, which the gold-diggers there popularly termed lava, and which, in its lithological character, so closely resembled the white felspathic slaty bed-rock which *underlies* the alluvial gold in Victoria, where its debris is called pipe-clay; and, further, questioning the propriety of these intensely-cleaved slate rocks being described as palæozoic by Mr Selwyn, who had found no fossils in them, I implied that these white rocks deserved more consideration as a constant of gold than they had received.

Demurring to the preambles of several official communications to the Government, which began by stating it to be "a well-known fact that quartz is the matrix from which gold in alluvia has been released," and objecting to the repeated affirmations in them that "the gold in alluvia has undoubtedly been disintegrated from the neighbouring quartz veins" in localities where no quartz veins of the auriferous kind had been discovered, and where the alleged disintegration appeared to me very doubtful indeed; and quoting, in point, a description of the Wentworth Gold-field by Mr Stutchbury, wherein he says, "that the original site of the metal is in the quartz rock immediately adjacent, is evident from the unabrased appearance of the gold;"—I remarked that the adjacent quartz rock was not of the visibly auriferous kind at all, and that the obviously-unabrased metal rested there upon an igneous rock, and in my opinion was undoubtedly upon its original site, having apparently been upheaved on its surface, associated with matter probably more perishable than the constituents of the subordinate solid rock now existing. Commenting likewise upon an elaborate Report of the Secretary of the Great Nugget Vein Gold Mining Company, in which the writer stated that "the gold found in the creek in the alluvium near the vein is not so waterworn as that found further down the stream, and that he had no reason to think from any gold which he had seen that it is produced in any other than a quartz matrix," I suggested that the rolling down the creek of molten metallic gold in the act of solidification would produce an abrased appearance of the more distant gold, precisely the same as if it had rolled in water, while the gold which settled and solidified near the quartz vein necessarily appeared less worn, if it were assumed that the quartz vein had been the fissure whence the auriferous matter had issued in the state of a molten liquid.

Dwelling in general terms upon the invariably flat character of all slate gold, which especially forbids the supposition of its abrasion from quartz veins, and of its having been rolled along and deposited in a solid state; instancing also the gold nuggets of the MacIvor in Victoria, which looked as if just cooled on a gritty floor, and pointing out that the horizontal deposition of the metal in free grains was always in the neighbourhood of igneous rocks, while it chiefly rested upon metamorphic rocks, and never in any abundance directly upon untransmuted fossil-bearing rocks, I was compelled to conclude its igneous origin beneath alluvia, and thence also the igneous origin of auriferous quartz veins. From these premises the non-auriferous character and the rounded forms of the quartz pebbles were explicable on the principle of their solidification after emission, the former phenomenon especially being incompatible with the doctrine of abrasion, since the innumerable rounded quartz pebbles, in such accumulations of them as exist at the Bendigo White Hills, ought upon the abrasion-hypothesis to exhibit some gold encased within the rounded stones in such small portions as would not materially affect their specific gravity, whereas there and everywhere else the innumerable superficial rounded quartz pebbles resting directly upon rich deposits of alluvial gold, were themselves utterly destitute of the visible metal. This fact, added to the consideration that the prodigious aqueous force necessary to detach them and round their angles would have swept them entirely away, far from their supposed original site in the neighbouring auriferous quartz veins, as well as far away from the free grains of gold embedded beneath them—there appeared to me no doubt that the apparently aqueous phenomena were subsequent to and of subordinate importance to igneous action in the deposition of placer deposit gold.

Noting the opinion of the Rev. Mr Clarke, that "the true origin of quartz veins has been caused by the cooling condensation in fissures of the rocks of silica dissolved in steam derived from peculiar traps, which may have produced auriferous impregnations as well as silicious;" and of Sir Charles Lyell, that "almost every metallic vein has probably been the channel by which hot springs, so common in countries of volcanoes and earthquakes, have found their way to the surface;" and of Professor Jukes, that "to many of the cracks and fissures caused by the intrusion of the igneous rocks among the aqueous ones, the molten rocks gained access and filled them up, forming what are called dykes, while others remained open until subsequently filled up with other minerals; that of these minerals quartz is probably most abundant, and besides quartz many other minerals accumulated in these veins, and among them many metals, such as lead, tin, copper, silver, and gold." I then accepted these opinions, that fluid matter from beneath had filled the gold-bearing quartz veins, but concluded, in connecting the inquiry with placer deposits, that it must have been in a liquid and igneous state, rather than either in steam, vapour, or thermo-aqueous solution; and offering in explanation of auriferous quartz veins in the midst of rich alluvial gold-diggings being so often V-shaped when cut transversly, the hypothesis that this shape is owing both to their filling anticlinal fissures, and to their having become enlarged at the top in discharging considerable volumes of auriferous matter; while other auriferous quartz veins were A-shaped, or at least diminished in thickness less abruptly downwards, because they yet contained their less segregated metallic contents, and were therefore the more valuable, and not always situate in the midst of the most prolific placer deposits. I pointed out the auriferous quartz vein near Wellington as an instance of the kind, since no diggings had been opened in its neighbourhood, although the gold-bearing veinstone itself had been now known for some time. And in conclusion, I invited Mr Hargraves, or any other geologist, to point out objections to the theory, providing that it should be done with the candour and temper of philosophical inquiry.

Sydney, March, 1854. (Signed) S. D.

Postscript, 1860.—While granites, as a class, are by some geologists termed "hypogene" rocks, upon the hypothesis of their having been formed at great depths in the earth, and of being even now in course of formation—an hypothesis of which Sir Charles Lyell may be considered one of the leading advocates in his 'Principles of Geology'—there are others, and among these is Sir Roderick Murchison, who consider that volcanic action, of a more energetic nature than any produced by modern volcanoes, has characterised the earlier geological periods, and that the igneous crystalline rocks owe their origin to a condition of the earth no longer existing. The opinion of

Sir Henry de la Beche, that granites have not always been formed in the earth at great depths, but in a molten liquid or viscous state have often protruded through the other solid rocks of the earth's crust (as I have assumed of the gold-bearing granites and quartz veins), and in doing so have often broken up the prior formed sedimentary rocks, fortifies the views which I have taken of the origination of gold, whichever may be regarded as the source of this metal—that is to say, whether the molten granite itself, or whether other igneous liquid matter which may have passed through the channels which are now quartz veins protruding through slates and schists. In the 'Geological Observer' of De la Beche, chap. xxx, is a passage in point, where the author remarks of the granites of the south-west of England, and in south-eastern Ireland, which are previously stated to be of more recent origin than the Devonian and Silurian deposits, that "the granitic protrusions appear the accompaniments of great contortions, foldings, and even dislocations of prior accumulations of all kinds, as if amid this squeezing and new adjustment of such accumulations, molten matter beneath rose upwards (there being sufficient pressure upon it), and occupied areas where the resistance of any prior-formed superficial covering was insufficient to resist this intrusion."

And again, observes De la Beche, "as to the extent of the fractures into the adjoining and prior-formed rocks, it may be considered as somewhat insignificant, when regarded with reference to their mass and that of the granites. In the range of the Wicklow and Wexford granite not only are these cracks found abundantly, but evidence is also afforded of huge detached masses of detrital rocks being apparently embedded in the external parts of the same granite. This can be well studied in Glenmalure, where such great masses seem as if partly contained in the granite, *having floated on that rock when in a molten state, like great icebergs in the sea*, and like them also in part submerged. No doubt this may be only appearance, as the parts connecting these masses may have been removed by denudation. At the same time, when sections are made of the whole on a scale equal for height and distance, and all the foldings of the older rocks are considered, a great breaking up of the latter seems needed to account for the mode of occurrence of all the rocks."

The theory of definite proportions, when applied to the formation of crystalline rocks, further teaches how any one or more substance, such as quartz or any other gold impregnated matter, may separate from a molten mass. De la Beche remarks, in the introduction to the work which I have just quoted, that "taken as a whole, the hornblendic or augitic rocks are compounds of those minerals and some member of the felspar family, there being sometimes an excess of silica beyond the amount required for the various silicates in the hornblende or augite, and felspar, *this excess then is, as it were, thrust aside as quartz.*"

That the excess of quartz thus thrust aside, and not having overflowed, should have arranged itself in lines or veins as the gold-bearing quartz has done, is a phenomenon seen in other igneous products, and even in modern volcanoes. These, in a molten state, escape as lava from cracks or fissures ruptured at the sides, and not always from the orifice or crater at the summit, which is often the vent only for gases and detached solids; then if the molten matter, instead of spreading on the surface, remain in the fissures, it solidifies into a dyke or vein. It may also here be remarked that there is little or no relation between the intensity of heat and the violence of discharge of modern lavas, nor by parity of reasoning, nor by actual observation, does a violent emission appear to apply to auriferous quartz veins, supposing them to have been molten emissions. Molten earth-springs, issuing as tranquilly from the earth as springs of cold water, are said by Humboldt to be the manner in which intensely heated lavas proceed from subterranean depths in modern volcanic regions, and intensely heated molten quartz may have issued in a like quiet manner.

The phenomena produced artificially by the cooling of molten silver in large masses seems to me very analogous to the mode in which I imagine auriferous matter to have separated from the larger molten mass beneath, and to have overflowed the superior solid bed rock, whether of the crust of the granite itself or of the neighbouring slaty and schistose mass. First, the silver solidifies over the surface, then little cones break through the crust and discharge a good quantity of oxygen gas, while the whole surface opens in cracks or fissures, and liquid silver, combined at a high temperature with oxygen gas, rises through them from the molten mass beneath, and overspreads the first-formed solid.—(See Dr Ure's Dict. Art. Silver).

Admitting with Sir Roderick Murchison that present volcanoes are but feeble indications of the activity of primordial heat and igneous outbursts in former geological epochs, I may here quote another passage from 'Cosmos,' which will apply equally to the outbursts of auriferous matter, of which some, if not all, the rocks enumerated have, when in their molten state, been, as I think, probably the source:—"There is," says

Humboldt, "a kind of volcanic phenomena especially instructive to the geologist, the products of which have not flowed from isolated conical mountains and volcanoes having permanent craters, but mountains have suddenly opened and after throwing up ashes and lava closed again, perhaps never to reopen—in these cases the connexion with the interior of the earth is not permanent, the action ceasing as soon as the fissure or channel of communication is again closed—veins of basalts, dolerite, and porphyry and the masses of syenite, augitic porphyry and amygdaloid have all probably been formed in similar manner."

That granites and similar crystalline rocks like those in the foregoing enumeration have, when molten, been more or less viscous is generally admitted, and (to quote Humboldt again), "other substances dissolved in vapours have issued from the earth simultaneously with the eruption of granite, greenstone-porphyry, and serpentine." It is my inference, then, that the separable auriferous matter erupted at the same time with them has been more liquid than the one, and less volatile than the other, and has borne somewhat of the same relation to the molten granite matter from which it has exuded or been thrust aside that a superstratum of cream does to the dish of milk, from which it has separated itself; and to continue this analogy, the gold itself stands in the same relation to the auriferous liquid which I suppose to have separated from molten granite or other igneous masses, as butter-globules do to the cream from which they are finally caused to appear in the visible form of butter.

That the alluvial gold in nature does not rest so much upon granites or other existing igneous rocks as upon the neighbouring metamorphic strata, to which the molten gold has adapted itself in shape, is a condition which favours the supposition that the auriferous matter, after having penetrated through the lines of least resistance, must have overflowed the neighbouring floors in considerable volume, and by analogies in chemistry with the phenomena of liquids at low temperature, the subsequent separation and independent solidification of gold-globules and quartz-globules during a descending temperature may be fairly demonstrated. The analogy of mercury when thrown down in globules from an aqueo-acid solution is perhaps the best illustration of such chemical separation as regards pure metals, while the following principles, which relate to liquids at low temperature, may equally well be applied to other liquid bodies, even at very high temperature, and be especially applicable to the gradually lowering temperature of recently emitted molten auriferous matter in which at different stages of the cooling process the separated quartz, gold, and other substances may have solidified. "When water holding any body in solution has its temperature sufficiently lowered, its congelation takes place in one or other of three ways—first, the water may congeal independently of the body which holds it in solution; secondly, the body which holds it in solution may congeal, leaving the water still liquid; thirdly, the water and the body it holds in solution may congeal together."

Globular shapes are commonly self-assumed by liquid substances, and also when two bodies, one of them being liquid, are brought nearly together while differing very greatly from each other in temperature, the liquid will assume a condition philosophically called "*the spheroidal state,*" a phenomenon which can be familiarly illustrated by pouring a small quantity of cold water upon a red-hot plate. The water will not then immediately spread itself and evaporise at once, as might be supposed, but will form into small globules, and in that state seems to possess the power of resisting heat awhile, until by slower degrees the two temperatures become more nearly assimilated.

It has been pointed out to me as an objection to the probability of gold-bearing liquid quartz having been discharged from fissures at a temperature as high as that of melted gold, that although existing auriferous quartz veins in transmuted rocks are in the midst of evidences of igneous action, the walls of the vein-stones themselves do not bear evidence of having been more especially subjected to heat than the general mass of rock which contains them. The spheroidal state of matter appears to me to explain this anomaly. The better developed auriferous quartz veins penetrate slates and schists, while the smaller ones traverse the igneous rocks. The slates and schists having been in a comparatively cold state, would suffer the discharge of intensely heated matter through fissures without the walls of the fissures being in the first instance acted upon by the high temperature of the emitted matter, because the two bodies might assume the spheroidal state towards each other, and afterwards, when the gold and quartz solidified in the vein, and in doing so imparted their heat to the walls of the vein-stone, the volume of the contents would then be too small to effect any special transmutation of the walls after the larger volume of auriferous matter had travelled away by overflow.

The phenomena attending the proximate contact of two bodies varying greatly from each other in temperature are also seen in modern volcanic eruptions. Intensely heated lava suddenly flowing among trees is described by one author as "leaving stalactites upon the branches, while the heat had barely scorched the bark;" and another instance to the same effect is seen in the following process :

> In crown-glass works it has been from time immemorial the practice to plunge the melted and very highly heated glass in some of the first processes, after removal from the melting-pot, into cold water to reduce the temperature. This does not fracture the glass, the steam produced preventing contact between the highly-heated glass and the water. In after processes, with the same piece of glass, a mere drop of water is employed to sever a large attached glass stem, the heat being now so reduced that contact, with its consequences, is immediate. It is not a little interesting at great crown-glass works to see both effects frequently produced at the same time and within the distance of a few feet.

These quotations are merely given to show that although the auriferous districts afford ample evidence in a general way of igneous action and metamorphic influence, yet that the immediate walls of veinstones do not necessarily exhibit the especial evidence of intense heat having been in direct contact.

In attributing an original spread of gold upon the floor to an igneous agency, I do not by any means deny (judging from present appearances) that great bodies of water have also once flooded many of the gold-fields. There is upon them indeed abundant evidence of aqueous floods of some kind, and if from any collateral testimony it could be satisfactorily shown that the auriferous deposits had occurred at the bottom of an ocean (the entire absence of marine exuviæ either in or upon the gold drift being, however, strong negative testimony against such an hypothesis), then the phenomena of matter in the spheroidal state might perhaps alone explain the possibility of a horizontal overflow upon a solid floor of molten liquid gold and quartz (without the eruption of any third hypothetical liquid); while a great disruption of superficial prior-formations would at the same time have originated the shingle and foreign fragments so conspicuous in auriferous drifts, and which being for a time mechanically suspended in the superincumbent water, would then have been temporarily protected from the intense heat of an under-current of molten matter. It may seem paradoxical to speak of glowing molten floods moving beneath cold water, but the fact, nevertheless, continues to be actually witnessed in the present day. Molten gold and quartz alone, without the contemporary emission of any considerable volume of a third hypothetical perishable liquid, might, in that case, have assumed globular shapes upon the spheroidal theory, and have rolled some distance over the solid surface of the bed-rock, when the gold and quartz existed as molten spheroids, and moved in a colder medium of either water or steam under great pressure, so that the ocean itself would then in reality be the perishable third substance, instead of any emitted hypothetical liquid or vapour. Provisionally allowing such an origin to be possible, still it would neither alter the originality and truth of the theory of an horizontal overflow of gold, nor the fact of the adaptation in shape of the metal to the bottom rock, with the sequitur that quartz pebbles have also solidified in spheroidal forms when moving in suspension. It is chiefly upon the fact of the adapted shape of the metal to the floor that the necessity of a transporting agent is founded, whether that perishable agent may have been an emitted igneous fluid, or whether simply surface water in the spheroidal state.

The petrifaction of igneous rocks into rounded forms is by no means a condition purely hypothetical, although quartz may not hitherto have been considered one of them.

> "The minor spherical structure," observes De la Beche (Geol. Obs., p. 404) "seen on the small scale in some volcanic rocks, and also in artificial glass, and which has been previously noticed, would appear to have been produced on the larger scale, under certain conditions in basalts, though by no means confined among igneous rocks to basalt. Sometimes this globular structure, as shown during the decomposition of the rock, is so irregular that *the whole has the appearance of balls of various dimensions piled up without much order;*" and again, in treating of erratic blocks, the same author remarks (page 256), "From the liability of certain igneous rocks to decompose in spheroidal forms, such blocks will sometimes present *the false appearance of having been rounded by attrition, as if worn on some coast.*"

The tendency to decompose in these shapes of itself argues the probability of some igneous rocks having had the tendency in certain conditions at the surface to an original solidification in spheroids, and when existing near the surface in such shapes they would of course be the most easily removed from their original position; and consequently leave but little evidence of their former presence for the future observer to speculate upon. The abrupt manner in which trap dykes terminate at the surface, and the rounded or waterworn (so-called) pebbles, in the alluvium which covers these dykes, besides the mystery of the whole subject of "the boulder formation," further suggest the probability that these round pebbles and boulders have frequently cooled in such shapes, either in the uppermost part of the dykes, or from an original overflow of their molten contents.

The conclusion that quartz pebbles owe their rounded shapes to an original solidification in that form is to my mind only a corollary to the stronger testimony which the heavier substance and the more plastic nature of gold has afforded; the one it appears having fallen to the bottom and shaped itself to the floor, while the other, from its lesser specific gravity, seems to have solidified in suspension in the more rounded forms. But it gratified me lately to read an able work on 'Bible Geology,' dated before the gold discoveries, wherein the talented and anonymous author contends at some length that the white rounded quartz pebbles in the conglomerates of the Old Red Sandstone, and similar strata of the primary fossilliferous epoch, originally resulted in that shape from some undefined law of crystallisation, and that their rounded forms are owing not solely to abrasion, but to an original petrifaction of quartz in those shapes. The similar palæozoic sandstones and conglomerates exposed in vertical section around Port Jackson or Sydney Harbour are many of them studded with the same sort of rounded white quartz pebbles. Some of the conglomerates in this locality consist entirely of round quartz pebbles, embedded abundantly in a matrix of arenaceous sandstone, and all the strata are aqueous or sedimentary rocks of Carboniferous or Permian or other post-Silurian date. There is no gold whatever, either within any of those quartz pebbles or in any of the strata immediately around Sydney. The formations which include the sandstones and conglomerates are such as would never be considered auriferous by gold-diggers, and no solitary specimen of gold has ever been found in them. The total absence of any gold in the strata near Sydney, where these round quartz pebbles are deposited, is highly corroborative of the conclusion of Sir Roderick Murchison, that the golden impregnations of the older rocks had not occurred when the Permian deposits were completed, for the older rocks in other parts of Australia are many of them now eminently auriferous, *i.e.*, they are traversed by gold-bearing veinstones, or have alluvial gold-beds resting upon them. If the quartz pebbles in Sydney conglomerates had been derived from the massive rocks of the auriferous districts, and were in truth fragments of auriferous quartz veins, one might at least expect to find some small quantity of gold with them; but there is, as far as known, none whatever. In no aqueous rocks of this kind in the world has any gold ever been found, but the horizontal deposits of the precious metal in grains are only spread upon floors of igneous and metamorphic rocks, and never interstratified or mixed with the quartz pebbles amongst the aqueous and fossil-bearing rocks of any age other than the superficial alluvium. Surely the metal would have been found, as an occasional curiosity at least, if not in workable abundance, in the older aqueous rocks, if the quartz pebbles which they contain owed their origin to a mechanical destruction of quartz veins from the older formations which are now auriferous districts, and if their rounded forms were solely due to an attrition in water; or, unless the auriferous quartz veins had subsequently appeared, and consequently not participated in any great denudation which may have supplied from those districts the materials deposited beneath the ocean during former epochs, now constituting the sedimentary rocks under consideration.

THE SECOND PUBLIC LETTER addressed to Mr Hargraves and published in the Sydney 'Empire,' in continuing the subject of THE ORIGIN OF GOLD, expresses the request that during his intended visit to Europe my proposed theory may be brought by him under the consideration of European savans versed in the several branches of abstruse knowledge which bear on the subject, and my belief that the many new facts adduced, with the cue thus given and the scientific aid invoked, will before long illustrate the natural phenomena, and finally prove the complete theory by known chemical laws more successfully than I can hope to do.

Remarking that it is always painful to witness misdirected labour, whether it be the physical toil of the gold digger, or the mental efforts of the scientific inquirer, and that I had often witnessed with equal regret energetic miners sinking deep shafts in search of gold in spots where it was most unlikely to be found, and intelligent writers making observations and reports based upon false hypotheses, or upon prejudices and associations without foundation in nature; while geological surveyors and writers on gold hitherto had been more distinguished for their knowledge of the stratigraphical order of aqueous and fossil-bearing rocks, derived from the teachings of Palæontology, than eminent for skill in the sciences of mineralogy and chemistry (the former being of very limited service in reporting on gold fields, whilst proficiency in the latter I regarded as most important),—and that had the hypothesis of the probable derivation of placer deposit gold from volcanic sources been earlier adopted, instead of the abrasion-hypothesis, an entirely different set of observations would in due course have been recorded, and a system established before now as satisfactory and complete as several theories on other subjects which are advantageously received in science as provisionally accepted truths.

Referring to one of the Rev. Mr Clarke's Reports, dated Jineroo (N.S.W.), 21st October, 1851, which I had seen in California, wherein that author concludes some disquisition on gold with the words: "Mica, therefore, and felspar are not necessarily connected with gold, but I think hornblende and quartz must be so, either alone or together." I observed that my own experience tended to the conclusion that rocks of the felspar and mica families (the latter including chlorite, talc, mica-schist, &c., and the former the white felspathic schists of Victoria, and the white felspathic lava or tufa of Moquelumne Hill), were intimately connected with gold, but that since the perishable lava theory had ripened to conviction, I was persuaded that the origin of the precious metal was not necessarily connected with any of these compounds exclusively, but that in the properties of the primary elements an explanation ought rather to be sought for the phenomena attending the deposition of placer deposit gold.

The following analogies were offered to illustrate its deposition both in the liquid and in the solid state. Water falls from the clouds through an atmospheric medium in three forms—in rain, snow, and hail. Gold has apparently been precipitated through the denser medium of an auriferous lava under three like conditions, namely, in liquid drops, in solid grains, and in crystallised pieces,—in the last form being very rare, but yet occasionally so found.

In shot manufactories melted lead solidifies in globular forms because the metal drops through the air into another medium, which has been regulated as to density, distance, temperature, and depth; without such regulations the molten lead would assume exactly such irregular shapes as alluvial gold has done, while the rounded or apparently waterworn forms would nevertheless still predominate.

Assuming, then, the suspension of golden atoms in some overflowing igneous liquid, and their aggregation in it into globules, and of falling in that state to the bottom, the temporary suspension of the auriferous molecules would, in all probability, be due to the chemical relation of the metallic atoms to other substances in the same liquid mixture. To conjecture what the auriferous molten liquid may have been, all possible chemical combinations of every known substance require to be hypothetically considered. The inquiry ought by no means to be confined to the science of mineralogy, which considers only the combinations that are found actually existing in the minerals, it having been already observed by a very high authority that neither the sciences of geology nor mineralogy can make any great advance without the aid of chemistry.

Calling attention to the facts that the metals in general readily combine with oxygen, while gold is quite an exception to the rule, yet that this noble metal spontaneously ignites in chlorine gas, for which it manifests a strong chemical affinity. With the alkaline sulphides, too, gold will easily enter into chemical combinations, and since the chlorides and sulphides generally are only fusible (that is, rendered liquid by heat) above the temperature of incandescence, while the metallic chlorides and sulphides, when solidified by the diminution of heat, are for the most part soluble in cold water. The chemical relation of gold to the chlorides and sulphides suggests transporting agents capable of existing in the molten state, yet perishable in their nature, and spontaneously separable from the oxides.

The salt in the ocean, the origin of which has already been attributed by some eminent philosophers to volcanic agency, presents a large totality of perishable solid matter, the constituent parts of its salt being chiefly chlorine gas and the alkaline-metal sodium; the latter, it is known, enters considerably as a component part into felspar, and gives to certain granites a soft character and a white appearance. Trusting that a purely hypothetical illustration might not be confounded with the more certain facts which have been enumerated, and assuming, for the sake of simplicity in illustration, that chlorine is the type of a class of electro-negative elements other than oxygen, and sodium of alkaline-metals, earth-metals, and other electro-positive elements, and that these substances have been intimately connected with the formation of visible gold in placer deposits—the earth-metal aluminium being the basis of clay, which, in fact, envelopes placer-deposit gold grains as universally as quartz encloses the visible gold in veinstones. It is, then, quite conceivable that molten haloid salts, or other perishable and igneous gold-containing liquid may have risen to the top while the oxidized mass remained beneath, and that gold in the visible and metallic state appeared on the top of the one and at the bottom of the other. Some process of this kind could, in my opinion, alone account for the fact of the placer deposits of gold being on the surface only of the bedrock, and of having been apparently melted on the floor, and of occurring in certain courses or "leads," which exist exclusively upon igneous and metamorphic rocks, and very often in neighbourhoods marked by the entire absence of auriferous quartz veins.

Accepting the opinion of Murchison that the auriferous drifts are newer than the tertiary deposits; and of Mr Selwyn, that they are of late tertiary date; and of Professor Trask, that they are contemporary with the deposition of the bones of gigantic mammalia; it would appear, then, that there has been an auriferous era when the placer deposits occurred, and that their formation has probably been as recent as the next in order previous to the historical epoch, while the total absence of marine fossils on all the gold-fields argues a subærial rather than a submarine effusion of auriferous matter.

While the forces of electricity and magnetism are by speculative writers sometimes vaguely alleged to have been active agents in the origination of metallic gold in veinstones, there appeared to me to have been no special activity of these agents in originating the placer deposits, but only such ordinary electro-molecular principles as were applicable to all atomic phenomena; finally I drew these conclusions:

1. Alluvial or placer-deposit gold has been thrown to the bottom in an overflowing volcanic liquid.

2. The liquid has cooled into solidity, and for the most part has since disappeared by decay and slight denuding forces, or possibly it may then partly have disappeared as a saline liquid, or even in vapour, without ever assuming the solid form. I have termed the substance a perishable lava in any of these cases.

3. The metal has often been apparently melted into its bed, as is well known to every gold-digger experienced in working gold-deposits upon hard slates.

4. The relation of gold to chlorine and oxygen is suggestive of a particular agent, which may have been connected with its original deposit, as well as why the noble metal alone has since remained a pure metal, while other contemporary metals have oxydised and frequently disappeared entirely.

5. The ocean is the grand reservoir into which the perished substances have been received, and the quantity of salt in its waters indicates what their nature may have been.

6. All the phenomena are referable to analogies in chemistry and physics, and compatible with a theory of volcanic eruptions already proposed by eminent geologists.

7. Auriferous quartz veins and other dykes have probably been fissures of discharge.

Concluding my letter with an expression of belief that it is not beyond the reach of science, with deductive reasoning upon known laws, to discover with some precision by examination of their remains, and of their effects on other rocks, the nature and kind of the auriferous emissions which have produced metallic gold, both in the state of placer deposits and in gold-bearing quartz veins. (Signed) S. D.

Sydney, April, 1854.

POSTSCRIPT, 1860.—The inference that an igneous auriferous liquid has overflowed, and been distinct from the liquid igneous mass from which it appears to have separated itself, is the chief novelty which I claim in this theory: the following quotation from 'Cosmos,' besides being graphically descriptive of the metamorphic theory, is explicit on the subject of different substances, in the state of vapour, having attended the eruption of igneous masses which together have transmuted the neighbouring rocks.

> "The metamorphic theory," says Humboldt, "has been established by following step by step the successive phases of transformation, and by bringing to the aid of inductive conclusions direct chemical experiments on the effects of different degrees of fusion and pressure, and different rates of cooling—the philosophical inquirer must ever keep in view the complicated conditions, and the unknown intensity of the forces which in the primitive world modified the reciprocal action of the several substances. It cannot, however, be doubted that the elementary substances always obeyed the same laws of affinity, and I am fully persuaded that where apparent contradictions are met with the chemist will generally succeed in explaining them, by ascending in thought to the primary conditions of nature, which cannot be identically reproduced in his experimental researches. The effects of intense heat are indeed apparent in all phenomena; but the degree of fluidity has varied very greatly in all of them—from the granite to the basalt; and at different geological epochs eruptions of granite, basalt, greenstone, porphyry and serpentine have been accompanied by the issue of different substances in a state of vapour * * * * the mere proximity of such a mass has frequently sufficed to produce modifications in the cohesion of the particles and texture of the rock, in the proportion of the siliceous ingredients and in the forms of crystallisation of the pre-existing rocks." * * * * "All the facts," continues Humboldt, "connected with our geological hypotheses on the formation of the earth's crust and the metamorphism of rocks, have been unexpectedly elucidated by the ingenious idea which led to a comparison of the slags or scoriæ of our smelting furnaces with natural minerals, and to the attempt to produce the latter from their elements. In all these operations, the same affinities manifest themselves which determine chemical combinations—both in the laboratories and in the interior of the earth. The most considerable part of the simple minerals which characterised the more generally diffused plutonic and erupted rocks, as well as those on which they have exercised a metamorphic action, have been produced in a crystalline state, and with perfect identity in artificial mineral products."

But while the metamorphism of rocks is referred to the agency of heat by numerous very high authorities, there are others who attribute metamorphic phenomena and the cleavage of slates entirely to slow electrical action. These have even succeeded in producing crystalline texture and slaty cleavage artificially with a galvanic battery. The question of the formation of metallic gold in nature as well as the metamorphic theory itself rests between these two principles, which may apply to placer deposit gold no less than to gold-bearing quartz veins. Experiments have been made to elucidate the formation of metallic and mineral matter in fissures by various inquirers. M. Gustav Bischoff, finding that some mineral substances not known to us as evaporating at any temperature are carried off by steam, as, for example, silica, concluded that by a process of this kind the fissures in the earth have been filled with mineral matter from ascending vapours; and the Rev. Mr Clarke appears to have adopted this view, as being the correct theory of the formation of auriferous quartz veins, when he conjectures that steam may have conveyed auriferous as well as siliceous matter from beneath to infill the fissures with gold-bearing quartz. A series of experiments were made some years ago by Mr Fox in the mines of Cornwall, the result of which it was thought established the conclusion that metallic matter has been deposited in veins by magnetic and electrical action somewhat analogous to that which is employed artificially when in the process of electro-typing a galvanic current is made to deposit pure metals from metallic salts in aqueo-acid solutions at ordinary temperatures. This other theory of the formation of metallic veins in general is not without able supporters, and it has even been accepted as the most probable as regards auriferous quartz veins by Mr Stuchbury, one of the Government explorers of the gold fields of New South Wales. But whatever theory may best explain the *infilling of fissures* with metallic substances, I assert in the strongest manner that, according to my observations, the geological conditions and physical relations of metallic gold in placer deposits forbid the conclusion that the metallic grains in alluvia *have chiefly been derived from destroyed veinstones at all*, but that the formation of the metallic grains *in situ* is the subject which requires elucidation.

Admitting, then, that the metallic gold grains of placer deposits have been originally formed upon an horizontal floor, the same leading question still presents itself, namely, whether the formation of the metal has been effected by the "tumultuous and sudden action of the volcano," or by "the calm silent operations on the minute atoms of matter by which nature seems to have filled the fissures in the rocks with her precious gifts of metals and minerals." Many vapours when subjected to great pressure become liquids; therefore my theory in its essentials more nearly approaches to that other previous theory which attributes the infilling of fissures to the cooling of ascending mineral vapours, than to the one which refers the same effect to the calm and silent operation of electrical forces.

"The atmosphere," remarks one distinguished authority in natural philosophy, "usually in a state of positive electricity acting upon the natural electricity of the earth, decomposes it, attracting the negative to the surface, and repelling the positive to the lower strata." Now it is universally known that by artificial methods a current of galvanic electricity will decompose metallic salts and deposit pure metal in no way distinguishable from melted metal, by attracting the metallic electro-positive atoms at one of the electrodes in an aqueous solution at ordinary temperature; it frequently occurred to me when speculating on the origin of placer deposit gold in California as not being altogether impossible, that the electricity of the atmosphere *acting vertically* as above quoted, might have produced slaty cleavage, and developed the metallic gold of placer deposits *horizontally* spread in detached grains upon the top of the massive slate by a similar process to the artificial method of electro-plating, and analogous to that electric and magnetic force known as terrestrial magnetism, which many mineralogists believe to have originated the *vertical* metalliferous veins in the earth by the power of electric currents acting in a direction *concentric with its surface.* I believe this suggestion is quite original as to the possibly slow electrical formation of placer deposit gold *in situ* by electric attraction of golden atoms to the horizontal surface, although my conclusions are certainly much more favourable to the igneous theory to account for the conformability of the metal to the floor; however, it is upon the facts which I had collected that I plume myself, rather than upon the theory, which is only an attempt to render the observed facts intelligible; and it was when in California the unknown facts which I had obtained, and the comparisons which I had been enabled to make, that led me to infer the generally auriferous character of the interior of Australia.

The two geological theories—the one, which regards alluvial gold as having been produced by the abrasion of gold-containing quartz veinstones, and a dispersion thence of the metallic grains upon the rocky floors by debâcles and ordinary floods of water, and the other, which alleges an original formation, whether by volcanic force or by electricity, of the metal in placer deposits upon slaty and granite floors, must be allowed by every candid reader to be widely at variance with each other; but as far as relates to every electro-molecular theory intended to explain how invisible golden atoms can have originally assumed a visible presence, I may repeat Mrs Somerville's concluding remarks in her admirable 'Connexion of the Physical Sciences,' that "the correlation between molecular and chemical action, light, heat, electricity, and magnetism, is continually becoming more perfect, and there is every reason to believe that these different modes of force, as well as gravity itself, will ultimately be found to merge in one great and universal power."

Part Third.

THE CLAIMS OF SCIENCE TO THE GOLD DISCOVERY.

SOME extravagant praises of Sir Roderick Murchison, which next appeared in the 'Sydney Herald' when reviewing a lately published pamphlet by Mr George Windsor Earl, the author of 'Eastern Seas,' and of other voyages and travels, provoked the following letter—Mr Hargraves being, at this time, on the way to England. The reviewer's loud boastings of the predications of science betrayed the scientific author, whose exaltation of scientific prediction contrasted with his depreciation of Mr Earl's passing remark, that upon his own judgment he had, before the late announcement of the gold discovery in Australia, and after making his observations upon the physical features of the one, and comparing them with the direction of the main mountain range in the other, arrived at the conclusion, and published it as his opinion—that Australia ought to be productive of similar metallic wealth to that produced in the countries which he had visited in the Indian Archipelago, where indigenous gold had long been known as one of the most valuable articles of commerce. The THIRD of my public letters I addressed as follows to the editor of the 'Herald,' on THE CLAIMS OF SCIENCE TO THE GOLD DISCOVERY.

SIR,—Referring to your review relating to the respective claims of Sir R. I. Murchison and Mr G. W. Earl, as discoverers by deductive reasoning of the existence of alluvial gold in Australia, it is worthy of remark that the two writers, though proceeding upon differing hypotheses, yet predicted a like result; and it may be worth the trouble to ask what exclusive claim either of them has to be regarded as the prophetic discoverer of gold in Australia, and to consider the wide difference between hypothetical inference and actual demonstration.

There is in the mass of mankind a proneness to take upon credit whatever assumes the name of science; the wildest conjecture the most unbridled imagination can suggest, when expressed in scientific phraseology, predicting a result which afterwards comes to pass, is often blindly believed to be referable to some profound train of reasoning altogether unapproachable by men of ordinary minds; on the other hand, there is a disposition amongst the initiated in science to repudiate all real discoveries which do not emanate from their own body, or are not founded upon their accepted prejudices;—the alchymists of old, the scientific men of their age, firmly believed, beyond all doubt, that base metals might be transmuted into gold, yet no such discovery has ever been made; with a far feebler belief of the possibility that alluvial gold might exist in Australia, did the scientific men of the present age express their surmises, and recommend trials to be made in this very extensive country, and then only after specimens in quartz had been already produced; yet, when alluvial gold is eventually found, quite irrespective of their speculations, discovered by comparing the conditions under which gold was found in California with the like remembered conditions in Australia—amounting, in effect, to a geological deduction carried to a successful demonstration, they assert that the fact was previously known by inference, as the alchymists might claim the transmutation of metals as having been to them a previously known truth.

That a professor and a president, when making an annual speech upon geology in the mining districts of Cornwall, should surmise gold existed somewhere in the long mountain range of Australia, would not of itself be any great matter of wonder, but ceases to be at all remarkable when published long after repeated specimens had been obtained by M'Gregor and others. That the suspicion of its existence was derived from any geological knowledge greater than the humblest digger possesses is an assertion that may be an agreeable *ex post facto* delusion, yet an allegation as unfounded in reality as it is unworthy of true science.

Mr Earl, as an extensive traveller, expressed his opinions without any lofty scientific pretensions, and though claiming neither sordid reward nor undue honour for the prediction, is just as fairly entitled to do so, after discovery, as any scientific professor who, after collecting facts and indulging dreams of possibility, expresses them when making an accustomed annual address, and afterwards exultingly points to his suspicions, published among numbers of other unfulfilled predictions.

In Mr Earl's 'Contributions to Physical Geography,' page 11, is a quotation from the 'Athenæum,' relating to a paper read by Mr Earl before the Geographical Society in June, 1845, where it is stated that Mr Earl had argued that the "similarity in the direction and character of the Asiatic and Australian mountain ranges renders it probable that the latter may be found as rich in mineral wealth as the former are known to be. The paper being concluded, Mr Murchison, the late President, took a decidedly opposite view of the matter, and maintained that nothing short of the discovery of similar ancient fossils in Australia and Asia could be admitted as proof of the former connexion of the two countries." There is some apparent inconsistency in Sir R. I.

Murchison's asserting on one occasion that gold might exist in Australia, because its mountains offered a parallel in direction and character to the Ural Ranges, and in denying at another time, without proof of the discovery of similar ancient fossils, its inferred probable mineral wealth, founded upon the very same conditions averred as occurring in the mountain ranges of Asia and the Indian islands.

Science never appears to greater disadvantage than in the gold discoveries, and it would be the more honest course for professors to confess it. Already illiterate diggers have begun to regard science and imposture as synonymous terms—professors and pretenders to be persons equally deserving discredit; and when you point out to them the many splendid triumphs science has achieved, they remind you of the alleged performances of John Calvert, self-styled geological and mineralogical surveyor.

Science has not only done little, but its shortcomings have absolutely prevented earlier discovery in Australia, as exemplified in my own experience. Before going to California with Mr Hargraves in 1849, I had travelled over the site of the present Bingera diggings, the Peel River diggings, the Braidwood diggings, and had lived two years on my sheep run at Goodgood, in Maneroo, about fifty miles from Braidwood, the sheep run being now demonstrated to be auriferous in every part of it. In California I remembered Bingera, the Peel, and Braidwood as formations of schist and granite which might possibly produce gold. As a passing traveller, pursuing a journey, I had seldom deviated from the road; however, on one occasion I dismounted to examine a quartz-vein on the Peel River, simply out of curiosity, not then seeking gold in particular; but on my own run at Goodgood, in Maneroo, where I knew intimately every rock and corner, I sought for gold diligently in the quartz-veins, the process of washing being then unknown to me. I never found a speck, and I owe that failure, as well as some remissness in not immediately returning to seek gold in the alluvia, to a blind confidence in the sufficiency of science. I do not now believe, after a long experience, that alluvial gold has been derived from disintegrated quartz-veins to the extent represented.

The constantly recurring thought, when in California, was not the question whether or no gold existed in New South Wales; for I knew of such a rumour, credited it, and believed gold to exist on my own run before leaving, but the first idea, when in California, was that it could exist in New South Wales in no very great quantities, or science would certainly have developed it; the faith in science continually operated against taking further steps towards ascertaining its presence on Goodgood until Mr Hargraves's domestic ties induced his return to New South Wales in 1850. I then sent with him a letter, and an accurate description of the localities, requesting him to examine the run again by the washing process, and instructing him when he should find gold on the slates, then to proclaim the existence generally of placer deposits of gold in patches on the slopes of the dividing range.

I have never since visited Goodgood, having parted with my interest, and believing the place to be insufficiently rich to be worked for gold under present circumstances. The only report I have seen of it is one of the Rev. W. B. Clarke's, dated Cooma, 17th November, 1851, where it is stated that no difficulty was found in obtaining gold in every pan, at a certain point of the Goodgood River, and there is added "no suspicion had existed of the auriferous nature of the alluvia of this river before I examined it." The reporter, I presume, was not aware that I had long before sent from California, by the hands of Mr Hargraves, a letter of introduction to my next neighbour, Mr J. Pethick, of Jingera, Maneroo, with exact verbal descriptions to himself of the particular points of the river and its tributaries which I thought most promising for the production of gold. Mr Hargraves, as all the world now knows, having seen associated quartz and slate many years before at Ophir, gave that locality the first trial, and the most triumphant success attended the attempt.

Sir R. I. Murchison, after seeing the diggings in Russia, and probably knowing that specimens had already been found in Australia—Mr Earl, after witnessing gold in alluvia in the Indian Islands—the Rev. W. B. Clarke, after knowing gold had previously been found in New South Wales, actually finding a piece in quartz himself, and indulging largely in speculative geology—Mr Hargraves, after seeing Ophir and comparing its geological features with California—myself, after examining Goodgood before going to California, and then comparing its rocks and its constants with exactly similar ones at Wood's Creek, in California,—each knew alluvial gold ought to exist in Australia—each could and did predict the probability of its coming discovery in Australia, and derived the opinion from his own observation, —totally ignorant, as I believe, of any previous prediction. In each case it was truly a geological deduction, to whatever pet hypothesis the inference may be referred, and however unscientifically it might be expressed. Fortune favoured Mr Hargraves, and he alone demonstrated the great fact of the existence of alluvial gold.

The amount of reward such a service merited is quite another question—the popular excitement of the times needed a hero to identify with the discovery, and in making its election no injustice was done to scientific claimants—if science did previously suspect from inference that alluvial gold might exist in the colony, the suspicion was equally entertained by the more intelligent amongst the diggers from the colonies, when in California, from inferences that were not of scientific, printed, or published origin. A Select Committee of the Legislative Council, in New South Wales, reported that Mr Hargraves returned from California "expressly to find gold," and another in Victoria found that he made the discovery known with "a noble disinterestedness, unexampled in history," and individual opinions must bow to the decisions of these bodies of collective colonial wisdom to whom the disposal of public money is entrusted; but the geological deduction, the conjecture, the alleged pre-discovery, is worth nothing until after demonstration, and then it is very easy for scientific professors to affirm that it was known, *a priori*, that alluvial gold ought to be present.

Some time ago Mr Hargraves received an intimation that scientific reputation in reference to gold was at a great discount in London, and agreeing with me, that alluvial gold had not been derived exclusively from disintegrated quartz-veins, he suggested that before his intended visit I should embody my views in a theory which would, with his sanction, as he imagined, be accepted as Gospel truth. I did so in a letter to the effect that alluvial gold had been separated from a liquid of volcanic production, issuing through fissures, now auriferous quartz-veins; that it had sometimes been melted into its moulds, but more frequently, like molten lead in shot factories or hail in the atmosphere, it had solidified before reaching its bed, leaving a scoria of an unusually perishable nature.

Mr Earl shortly afterwards gave me a copy of the 'Contributions,' and I unexpectedly found some similar ideas expressed in his writings of the Indian Islands:—his observations led him to infer that gold exists "very generally diffused throughout the granites of the primary ranges, but in a state unavailable for the uses of man, until the metal had been collected and expelled by the chemical action of volcanic currents—the liquid metal seems to have been projected into the detritus at the base, or on the slope of the ranges, and so great has been the intensity of the subterranean heat, that where the volcanic bands have crossed primary ranges, scarcely a vestige of their former character remains, except gold; all the previous formations having been melted up and dissipated." The mode of deposition of the liquid metal I regard as correctly viewed, but derived, as I think, from subterranean sources; the total destruction and dissipation of granites by such means as there described appearing to me to be physical impossibilities.

If, upon these crude hypotheses, Mr Earl, in 1845, foretold the mineral wealth of Australia might be equal to that of the mountain ranges of Asia and the volcanic Indian Islands, it may be inquired, before awarding any commendation to Sir R. I. Murchison, whether the more elaborate hypotheses upon which his suggestions were made are more certainly true, and that gold exists in Australia as a consequence of their correctness. I do not think the consequence is established; it is not because the Australian cordillera is a parallel of the Ural that gold necessarily exists, but because there is no meridional mountain range in the world of an equal extent where gold is not found—the recommendation of a trial proves no prescience, nor a subsequent discovery any necessary relation; and the notion of the derivation of all alluvial gold from disintegrated quartz-veins, and from a state of dissemination through the mass in granites, lime-stones, and clay-slates, and the subsequent deposit of the metal exclusively by ordinary aqueous means is another hypothesis of Sir R. I. Murchison's which cannot be admitted.

It may safely be affirmed that no valuable mineral deposits will ever be found, but some scientific dreamer, more sanguine and speculative than determined by the weight of evidence, relying upon some fanciful hypothesis, will have already predicted it; in late speculations upon further discoveries in alluvial gold, almost invariably platinum and diamonds have been foretold in available quantities, yet where are those promised minerals? If by any accident or diligent search a bed of diamonds should hereafter actually be found, a thousand visionaries would spring up, and say that they had already foretold the event. The more recent predictions of science in relation to gold have been quite equalled, and often surpassed in truth, by those in brokers' "gold circulars," in newspaper letters from "our own correspondent," and even in the slopselling advertisements of King-street clothes-dealers.

Admitting Sir R. I. Murchison to have unequivocally recommended a search for gold in Australia, it must be remembered that the equivalent of a digger's experience was first obtained by him in Russia; and coupling this fact with that of M'Gregor having already found specimens in New South Wales, Sir R. Murchison could assert the probability of more gold being found in Australia, with the same ease that any unscientific digger can assert it to be likely gold may be found wherever associated quartz, granite, and slates are seen. The assertion of the digger is just as truly a geological deduction as the same idea expressed in scientific phraseology or in learned reports by writers employing a diction of anglicised Greek; it is not to any profound and occult knowledge of geology that the inference is to be attributed, but to the most commonplace observation, and with the great advantages of position, and the Russian experience possessed by the distinguished author of 'Siluria,' the surmise is expressed with a feebleness and attended with results so utterly barren, until the gold-fields were developed by experience derived from another quarter, that the indecision is culpable rather than the conjecture meritorious.

Scientific associations collect facts for generalisation and dissemination usually from more laudable motives than money-making for their own immediate collective or individual benefit, and are expected to abstain from appropriating to themselves the rewards or honours which a discovered fact brought to them may deserve. The communities which have been benefited from the gold discoveries of California and Australia owe neither gratitude nor acknowledgments to scientific associations or to professors for revealing to them the golden deposits of nature; nor are the discoveries due to the questionable hypotheses on which their surmises have been founded. Science, or the pedantry which too often passes for such, has rather been an obstacle in the way to prevent an earlier discovery, and professors are yet in great perplexity to find in the whole range of natural philosophy any principle or general law to which the origin of gold, either in alluvia or in quartz-veins, can with any show of reason be attributed; and, instead of reward for having done much, the professedly learned deserve derision for having done so very little towards the first discoveries and the subsequent developments of gold-fields on both sides of the Pacific.

I am Sir, &c.,

Sydney, 8th Oct., 1854. SIMPSON DAVISON.

I had at this date but recently found, by the merest accident, the Official Report of the Rev. Mr Clarke upon the auriferous character of my former sheep runs of Goodgood and Cowra Creek. I still remained uninformed of the fact, which subsequently came to my knowledge, that the Rev. Mr Clarke had, before his examinations of the neighbourhood, seen the letter which for Mr Hargraves's service I had written with reference to alluvial gold being there when in California. I have since learnt that the letter in question was exhibited on their first meeting at Braidwood. This introduction is thus mentioned by Mr Hargraves in an Official Report, dated 20th October, 1851:—"I have had an interview with the Rev. Mr Clarke of the most friendly nature, and an interchange of ideas on the subject of our respective missions, the result of which has tended to our mutual edification and the public good. We now clearly understand each other, and are the best of friends."

The two subjoined Official Reports are those which relate to the Cowra Creek, the Goodgood or Berudba River, and the neighbouring localities. These are mostly situate upon the *western watershed* of the dividing main range at no great distance from and on nearly the same parallel of latitude as the more celebrated gold-diggings at Braidwood, which, contrary to the more frequent condition in Australia, are here situated upon the *eastern watershed* of the Cordillera.

Copy of a Letter from the Rev. W. B. Clarke to the Colonial Secretary.

Camp, at Bulunamang, 10th November, 1851.

Sir,—I have the honour of reporting to you, for the information of his Excellency the Governor-General, that since my last communication, dated Jineroo, I have made an examination of the country between that place and this, by way of Bombay, Mahar, Lake George, Gidleigh, Queanbeyan, Micalago, and the Berudba.

With his Excellency's permission, I will reserve till a future opportunity my detail of the geological phenomena in the districts lately examined, and confine myself to an enumeration of the localities in which I have ascertained the existence of gold since I left Jineroo.

I obtained it at Warri, on the Shoalhaven, not only from granitic detritus, but also from the pebbly alluvium of the river bank, south of Warri I did not obtain any satisfactory evidence respecting it in the creeks falling from the Bombay Ranges, in the Maloon, Butmard, and Turallo Creeks, nor in the creeks falling eastwardly into Lake George on the parallel of Ellendon. But on searching the Molongo River, below the crossing place from Turallo Creek, I found gold readily in the detritus of the river bed. I also ascertained its existence in the Queanbeyan River, though it is not abundant there. It occurs also in a tributary to Smith's Creek, between Queanbeyan and Micalago.

On the right bank of the Murrumbidgee, below Micalago Creek, I also very readily obtained gold in every pan of earth which was washed; and also above that creek, at Yangielera Creek and the Berudba River, I have ascertained its existence. *I have also to report that along Cowra Creek, and in parts of the Berudba, it occurs, distributed in specks and small grains.* I have also detected its existence in the Murrumbidgee, and some of the western creeks near this place; but the river and creeks being in flood, I do not consider my present examination satisfactory; the state of the approaches to the alluvial deposits being almost unsuitable to prospecting purposes. From what I have seen, I am, however, under the impression, that though large tracts of slate and quartz have proved to be not auriferous, yet where hornblendic granite occurs, there gold is found. And I think the banks of the Murrumbidgee will, ere long, be wrought. *Two persons have already been at work at Cowra Creek, and have produced a very fair sample, which I have examined.*

The gold appears to me to be all from a granitic matrix, being in character like that of Araluen.

I have the honour, &c., W. B. Clarke.

Copy of a Letter from the Rev. W. B. Clarke to the Colonial Secretary.

Cooma, 17th November, 1851.

Sir,—I have the honour of reporting, for the information of his Excellency the Governor-General, that since the date of my fourth Report I have examined the Berudba River in the direction of its southern branches, the Cowra Creek, &c.

1. I am now able to confirm the report of the existence of gold in the Cowra Creek, and to state that it occurs in Bircher's Creek and Frog Hollow, where, as I have every reason to believe, it has been found by a person living in the neighbourhood in some abundance. The Berudba River is called the "Good-Good River" in a part of its course between Cowra and the junction with Bircher's Creek, and in the "Good-Good," at a locality where it takes a remarkable bend in the midst of highly inclined beds of schist and quartzite, I found no difficulty in obtaining several specks of gold in each pan of earth, collected by clearing out the interstices of the laminæ of the slate. No suspicion had existed of the auriferous nature of the alluvia of this river before I examined it, though gold had been found in the Cowra.

I do not venture upon any opinion as to the commercial value of these localities as respects gold, but it is very probable that, when the shearing time shall have passed, there will be numerous prospectors now the existence of gold is established; and the metal may be found in some abundance, as well as in other neighbouring localities.

I have the honour, &c., W. B. Clarke.

To my third public letter the Rev. Mr Clarke publicly replied, and to his reply appended several certificates respecting his own gold predictions. The appended letters and papers stated several circumstances of which I had not previously heard, and especially apprised me, through Mr Blakefield's letter (No. 2), that the shepherd's gold-findings near Wellington were not entirely unknown to him. The reply appeared thus :—

Sir,—I observe in Tuesday's 'Herald' a long letter signed "Simpson Davison," the object of which is to endeavour to show that "science" has "hindered," instead of advanced, the early discovery of gold in this colony, and that all so-called scientific merit is undeserving of any reward. It is not my intention to combat this opinion, because every one has a right to judge for himself in such matters; and Mr Davison is the only judge, how far in his own case this opinion has been tested. I will only remark, that the example he has adduced—that from "Goodgood," in Maneroo—appears to me inappropriate. He quotes a few words from my report from Cooma, 17th November, 1851, respecting my statement that gold had not been suspected in *that* river (which, whether rightly or wrongly, I called Goodgood), omitting all that bears upon other creeks or other explorers, and says, "long before" he had written to Mr Hargraves, from California, pointing out the particular auriferous localities in that creek. This, of course, only applies to his own correspondent, whose great boast has been that he is the "first," and "first *scientific* discoverer," of gold in the colony. Whether *his* "science" (derived as it all was from Mr Davison) "*hindered*," or rather retarded discovery at Goodgood, I know not; but this I know, that with all the light he received from Mr Davison, with all his knowledge of particular localities, after having journeyed from Jineroo by Jingera to Goodgood, and searched for gold, he declared his "friend Davison's" judgment was defective, inasmuch as no gold whatever existed there! "Science," therefore, did not do much certainly at Goodgood, but it might have done, had it been really known that where gold can be found in quartz veins, or other substances, *in situ*, it is highly probable it will exist in the neighbouring alluvia. I think Mr

Davison too much depreciates "*science*" when he ridicules it after the manner of his letter, and yet considers his "theory" the only one which can explain the formation of gold as we find it distributed in the earth. It is to be hoped his correspondent, Mr Hargraves, will succeed in setting all the stray men of "science" right in Europe, and teaching them a moral lesson on the subject. But it is a pity Mr Davison "let the cat out of the bag" about the arrival of the "hero," as he calls him, from California, in 1850; for, till now, nobody had ventured to say it was his "*domestic ties*" which brought him thither, whatever may have been thought. As another opportunity will some day be afforded of discussing the facts of the "great discovery" of 1851, from documents in my possession, as well as of entering upon some other curious facts and phenomena connected with this question, which I will promise to treat, not after any so-called "scientific" manner, but in a plain matter-of-fact way, I will only now express my conviction that Mr Davison has injured both his own pretensions and those of his friend, by his letter, which before rested upon some assumption which nobody denied, and request you to be so good as to print the following documents, in order to show, that though "long before" Mr Hargraves came from California, he (Mr Davison) had ascertained the auriferous character of Goodgood, which Mr H. could not confirm after all; yet "*long before*" either one or the other *went to* California, I had arrived at definite conclusions respecting various other localities in the colony, all of which, and a great many others, have been since proved to be correctly indicated, and I may add, that had not Mr Hargraves, relying too much on his "science," refused to examine localities which I pointed out to him in the Colonial Secretary's office, in 1851, before he started as Commissioner of Gold Fields, he might have rested some of his claims upon something more substantial than the glories of Ophir, and have been the "discoverer" of the Southern Fields, which his Californian "science" or his borrowed Davisonian philosophy, led him to depreciate.

How far any interferences respecting "Goodgood" are or are not borne out by the extract made by Mr Davison from my report of 17th November, 1851, will be seen from taking the whole passage which he refers to, and not the very few words of it which he has extracted.

The inference as to "suspicion," &c., was derived from the distinct statements of the then numerous gold-seekers in Maneroo, by one of whom I was piloted to the district. I reported the "specks" I found, because my rule was to report all that I observed, and to leave *time* to test the further capabilities or commercial worthlessness of a locality. If I had not reported thus faithfully, without exaggeration, I should not have deserved the only reward I have got—from some of my friends —viz., "more kicks than halfpence." I am, Sir, &c.,

October 12, 1854. W. B. CLARKE.

TESTIMONIAL LETTERS APPENDED TO THE ABOVE.

No. 1.

From R. THERRY, Esq., one of Her Majesty's Judges of the Supreme Court.

Keera Vale, Wollongong, October 2, 1852.

MY DEAR SIR,—I can have no hesitation in stating I quite well recollect the circumstance of your communicating to me your discovery of Gold. The conversation took place on board the Paramatta steamer some time in 1844, on my return to Sydney from a visit to a part of the country which I then represented in the Legislative Council. On that occasion you showed a piece of quartz in which two or three large specks of gold shone very distinctly and brilliantly; and you intimated that from that and other specimens you have seen, and from the geological observations you had made, you were confident that gold would be found in abundance in this colony. I mentioned the matter to many of my friends at the time, and the recent extensive discoveries of gold brought very vividly to my recollection your predictions, which these discoveries have verified.

I therefore can have no objection to the mention of my name in the manner in which you have introduced it in your evidence.

Believe me, &c.,

Rev. W. B. Clarke. R. THERRY.

No. 2.

From MR CHARLES BLAKEFIELD, a successful Gold-digger, written voluntarily.

Sofala, 11th September, 1852.

REV. SIR,—The long controversy in the public papers respecting the alleged original discovery of gold in this country having now ceased, I beg to apologise for my negligence in not having sooner added my evidence in proof of your attainments as a geologist.

About nine years ago I gave you a piece of gold in quartz, found at Mitchell's Creek, and brought down by M'Gregor the shepherd, when you informed me that nearly the whole of the rivers on this side of the dividing range were highly auriferous. At the time I asked you why you did not make the fact known to the public, when your reply was that you were afraid that it would tend to the utter disorganisation of society, particularly as then constituted.

But had I known that the whole science of gold-washing lay in the shaking of a tin dish, I am doubtful whether any such considerations of public policy would have prevented me from essaying the facts at that time, particularly as a friend of mine was also at the time extremely urgent upon me to join him in a prospecting tour.

I am, Rev. Sir, &c.,

Rev. W. B. Clarke. CHARLES BLAKEWELL.

No. 3.

From F. E. MANNING, Esq., voluntarily written.

Carraboat, Tarcutta Creek, 20th November, 1851.

MY DEAR SIR,—Although some years have passed since we met at Appin, I have during the last few months often recalled to mind your saying that you knew where to find gold on the Bathurst side, and finding that you proved a good authority in that case, I was tempted to go prospecting here, as I hear you stated that this was a likely locality to find gold. I think that you will be glad to hear that your prediction proves to be correct. This place is situated on the right-hand branch of the Tarcutta Creek, coming up, and is about forty-five miles from its junction with the Murrumbidgee River.

A shepherd in the employment of Messrs Walker and Co., at a place called American Yards, eight miles lower down the creek, has also found gold there of the same description as it is here, and he tells me that he has found some on a hill side that looks "as if it had been melted," but he will not show me any of this.

I remain, &c.,

Rev. W. B. Clarke. FRED. E. MANNING.

No. 4.

From JAMES MACARTHUR, Esq., M.L C., who was Chairman of the Gold Committee on the 24th September, 1852.

Camden Park, Camden, 29th July, 1854.

MY DEAR SIR,—I have deferred answering your note in order to refresh my memory by a reference to memoranda connected with public transactions, which I know took place at the period of conversation relative to your *first* discovery of gold in the Hartley district, and your conviction from geological investigation that Australia would prove to be a great *gold*-producing country. I find, upon reference to those memoranda, that your communications to me on the above subjects must have been in 1843 and the early part of 1844. I well recollect that you pointedly alluded to the grave objection to opening gold-mines to the cupidity of a population which at that time constituted the great majority of the inhabitants of these colonies, and you mentioned the wrong views entertained by Sir George Gipps as to the ill consequences to be dreaded from a disclosure of what you had ascertained.

On more than one occasion you expressed a hope that opportunities would be afforded to you to pursue your geological researches, and you declared your firm conviction that gold, with other valuable metals, would at no remote period constitute a most important part of the resources of the colony.

You also mentioned that your own object, apart from your public duties, were confined exclusively to the extension of science.

Believe me, &c.,

Rev. W. B. Clarke. JAS. MACARTHUR.

No. 5.

Extract from a Letter of H. K. JAMES, Esq., Secretary to the late Bishop of Sydney.

I have no certain recollection when you first told me that you had found gold in this country, but I thought, and still think, that you alluded to the fact in one of your notes to me a very long time ago, which, if I could have found it, would be of much value to you now.

You have been, as long as we knew you, always speaking about "the mineral resources of Australia," that it was "full of gold," that we should "live to see this one of the richest places on the globe," and so forth. "Clarke's prophecies" upon these subjects were as "familiar as household words;" they seemed, however, at the time, long before H. was ever heard of, to be idle tales, and as you were very generally regarded as a scientific enthusiast, your observations and truthful predictions received very ordinary attention, and entirely failed to make the impression they were calculated to do. I have often thought, if not said, "if half of Mr Clarke's predictions of what this country is made of proves true, it will be good to be here," and such I have no doubt was the sentiment of many with whom you conversed about your golden dreams of Australia. * *

Yours faithfully,
3rd June, 1854. H. K. James.

No. 6.

Letter from Captain Philip Parker King, R.N., M.L.C., &c., voluntarily written.

Parramatta, May 30th, 1851.

My dear Sir,—Having noticed a remark of Mr Hargraves upon your claiming to have been the original discoverer of the gold-field now being worked, and which appears to me to attach doubt as to the correctness of your statement, I think it right to remind you that about two or three months ago you pointed out to me, on Dixon's Map of New South Wales, a considerable extent of country in the neighbourhood of the Canobolas in which gold was known by you to exist in large quantities.

If this communication can be of any service to you, you are at liberty to make any use of it you please.

Yours, truly,
Rev. W. B. Clarke. Philip P. King, Captain, R.N.

The following rejoinder, I addressed to the Editor as a FOURTH PUBLIC LETTER, the subject more particularly relating to the Rev. Mr Clarke's Claims.

Sir,—The mistaken view the Rev. W. B. Clarke takes of my sentiments requires some further explanation.

I have not by any means endeavoured to show that all scientific merit is undeserving of any reward; I think, on the contrary, that it ought always to be most liberally rewarded; but I question that the gold discoveries and developments are owing to scientific merit more than to that sort of knowledge which Mr Clarke is pleased to describe as Californian science.

One of the best rules Mr Clarke ever laid down for gold-finding is the *similis simili gaudet* principle (the classical term for Californian science), which is a guide obviously as much within the reach of the vagrant illiterate digger as of the profoundly scientific geologist.

In the services Mr Clarke has rendered by his numerous reports, so highly valuable for their descriptive geology, I recognise a mixture of geological science and practical experience, while it is to the latter chiefly that his discoveries and successful predictions are due, and to the former that his observations are made intelligible to distant geologists. I am far from insinuating that those services ought not to be adequately rewarded;—the labourer is worthy of his hire, and the labour has been done and performed in an able and workmanlike manner;—but I object to the principle of paying speculative prediction, and question the soundness of many hypotheses which the reports contain. If any remark of mine will alleviate the pain from the kicks he has received, or compensate for the paucity of halfpence, I will observe that I do not think those labours have been adequately rewarded. It is a reproach to the colony that his real services, marred only by an unfortunate propensity for far-fetched conjectures, should receive a remuneration probably less than the amount obtained by the deliberate roguery of a certain *soi-disant* geological surveyor, whose imposture I trust Mr Hargraves has before now successfully denounced.

If Mr Hargraves ever received any light from my philosophy, I cannot compliment Mr Clarke by saying that he ever received the faintest glimmer from his geology: for, upon my inquiring of him what he thought of one particular report, he assured me, with a smile at my simplicity, that nobody ever read, and that it was impossible for any body to understand, Mr Clarke's reports, since even their author, when he read them over a second time, was quite unable to comprehend the meaning of his own writings.

The passage about domestic ties, which in a beautiful and poetical simile is compared to letting a cat out of a bag, is surely no new information to Mr Clarke: it is quite possible for Mr Hargraves to have returned purposely to search for gold, and yet to rejoin his family at the same time. If Mr Clarke did not venture to say what he thought, his friend Mr Macarthur, M.L.C., Chairman of the Gold Committee (the same who once called diggers greedy gold grabblers), was deterred by no such weak timidity. I refer Mr Clarke to that high authority, and to the members of the Select Committee, all honourable men, for the satisfaction of learning that Mr Hargraves returned to Australia "purposely to search for gold."

It is news for me to learn that Mr Hargraves declared his friend Davison's judgment to be defective, and that no gold existed at Goodgood. It seems, then, that it was at that time publicly known that Mr Hargraves was on a gold-searching errand at my request, and that though failing himself, yet in consequence of the hint getting abroad, gold was sought for and found shortly afterwards by diggers in some abundance; and lastly, that I am indebted to a scientific geologist for confirming the fact that Davison's judgment was right after all. Mr Hargraves spoke disparagingly of Goodgood, but I have understood that he found gold in the spots I had indicated.

My letter was not written to Mr Hargraves, but placed in his hands in California, addressed to Mr Pethick, and requesting his hospitality. Some conversation took place at the time as to whether or no I should describe the auriferous localities in my letter, but finally it was concluded to leave the avowal or the secrecy of the mission at Mr Hargraves's discretion, and consequently no written description of them was given. The Cowra Creek mentioned is on the Goodgood run, and in Froghollow I ran a flock of sheep, and knew it equally well, though I had less confidence in the granite of Froghollow than in the slates of Goodgood and Cowra Creek.

The forthcoming curious facts and phenomena I shall read with pleasure, and trust (yet feel some latent doubt) that if any new hints have been obtained from my theory, they will be duly owned, and not be found as unacknowledged plagiarisms, or crushed by assertions of an *à priori* knowledge.

I heartily join in the wish that the stray men of science in Europe may be set right, for they have certainly not hitherto been upon the right trail in reference to gold—its origin will eventually be referred to some one simple principle, relative to which drifts and denudations are only subsequent phenomena. The one I have proposed is the likeliest I can conceive, and if the stray men do not please to accept it, it may be owing either to the inability of its advocate, or to the stray men's inveterate pride of false knowledge; and yet, like the searchings for gold at Goodgood, it may be found to be true at last.

I have solicited no halfpence because I inferred gold to be at Goodgood. I sought it there in quartz matrix before leaving, and I failed to find any gold in quartz. I became convinced, however, in California that the metal existed in alluvia at Goodgood. Still I was puzzled to conjecture why, if it were in Australia in any quantity, science had not before developed it. The overt act of sending by Mr Hargraves to try once more by washing the earth was like charging an enemy again after a first repulse, and the renewed attempt made by his agency, it now seems, was again a temporary failure; yet gold was there notwithstanding—the deduction was perfectly true. If Sir R. Murchison surmised gold existed somewhere in the Cordillera—if Mr Clarke had previously arrived at conclusions respecting other localities—yet I had indicated this particular spot long before the discovery at Ophir, in utter ignorance of previous scientific prediction. I therefore contend, as in my former letter, that Sir R. Murchison has no exclusive claim to be regarded as the prophetic discoverer, nor, as Mr Clarke avers, did he utter the first scientific prediction. I object to any exclusive reward —for which I understand an application has been made to the Imperial Government—being given to Sir R. Murchison under the impression that the alluvial gold discoveries in Australia occurred as a consequence of his particular prediction. I am, Sir, &c.,

Sydney, October 15, 1854. SIMPSON DAVISON.

To this the Editor appended the following remarks:

So far as we understand the subject of this and Mr Davison's former letter, his object is to advance his own claim to be the author of the only satisfactory theory of the formation of gold, and to have predicted gold at Goodgood. We did not perceive that Mr Clarke denied either of these claims. Mr Davison now admits some reward due to *certain kinds of science*, and thinks Mr Clarke entitled to reward far beyond what the Council has granted him. A great many other people think the same. That Mr Hargraves did not appreciate Mr Clarke's reports may be very likely; his opinion of them will no doubt amuse the writer of them. All persons agree that Sir R. Murchison has no claim whatever on the colony, and that the gold discovery was in no way indebted to his supposition that gold might exist here. We believe Mr Clarke thinks as little of his own predictions. But we concur with Mr Davison in considering that the results of Mr Clarke's practical experience, now sufficiently proved, merit a more substantial remuneration than he has received. But in saying this we believe he had no intention of urging such a consideration when he replied to Mr Davison's first letter.

Part Fourth.

THEORETICAL CONTROVERSY.

In 1854 a collection of the natural products of the colony was exhibited in Sydney previously to their being forwarded to the Universal Exhibition of Natural and Industrial Products of all nations, which took place in Paris in 1855. The Rev. Mr Clarke arranged, and for the most part contributed, a series of fossils and minerals to illustrate the succession of the Rock Formations in New South Wales. A short notice of them by himself appeared in the descriptive catalogue, in which, apparently upon the assumption that alluvial gold owed its origin to a release of the metallic particles from a stony matrix or from igneous rocks (such as the granites, which abound in the auriferous districts he had explored), and without any reference to the speculations of Murchison and others on the geologically recent origin of gold, the author concludes not only that the age of the gold in the colony is coeval with the Palæozoic formations, or with the igneous outbursts connected with them, but that the protrusion of such igneous rocks through sedimentary rocks of the Silurian, Devonian, and Carboniferous eras, in localities where no other sedimentary rocks with coeval marine fossils are imposed upon them, fixes the date of the gold-bearing rocks, whether igneous or aqueous, as being coeval with the formation of the geological systems enumerated; although it is not even alleged that the sedimentary rocks of those eras contain either the fragments of auriferous rocks encasing visible gold within them, or free grains of the metal diffused within their fossil-bearing strata, in the same manner as gold is found disseminated in recent alluvium.

The exact words were as follows:

> " An inspection of the present collection will sufficiently demonstrate the high antiquity of the solid portions of the Australian lands; for nearly the whole of the formations are Palæozoic, with an absence of all (or nearly all) traces of secondary, and with nothing left but two divisions of tertiary formations, and these scantily expanded, to mark the interval of enormous periods of time, and the break of many thousand vertical feet in the stratigraphical scale.
>
> " All alluvial beds of the auriferous districts, above the gold deposits, are not represented in this collection; because the exhibitor, having examined and tabulated the products of those beds with a separate intention, and for the purpose of preserving an independent record of the specimens in the gold collections made by the various Commissioners, saw no necessity for introducing them here. But he takes this opportunity of stating, after some experience, and from a thorough acquaintance with nearly the whole of the colony, *as his opinion respecting the age of its gold*, that its formation has taken place in rocks of the Silurian, Devonian, and Carboniferous eras; and (as well expressed by M. Jules Marcou, in the explanatory text of his Geological Map of the United States, p. 75), ' in rocks whose dislocations have taken place during the second period of the Palæozoic formations, from the end of the Silurian deposit to the Permian epoch.' "

These ambiguous lines appeared to me to express no opinion at all of the age of the gold in the colony, and therefore I wrote a public letter under the pseudonym of ' Investigator.' This brought forth three articles in the daily papers on the ' Gold-fields of the Russian Empire.' The writer of them, after recapitulating most of the fossiliferous evidence given by Sir Roderick Murchison to show the recent origin of alluvial gold, —and quoting a general review of the gold-producing countries of the world by ' Viscomte D'Archaic,' with some speculations of M. Engelman, and the observations of Humboldt in ' Central Asia,' concluded by alleging that gold is a recent mineral product, the least distant in point of time from the historical epoch, and that all writers were now agreed in attributing the release of alluvial gold from a stony matrix to *atmospheric agency!* There was one passage in italics, stating that in Siberia M. Hoffman had found gold *disseminated in great masses of argillaceous schist*, which I understood to be an inquiry intended for me, and as I knew that the Rev. Mr Clarke had in his earlier reports encouraged the doctrine of the equable dissemination of gold in granites, "schists, slates, and quartzites," I dwelt especially on this subject in the next two essays. The anonymous replies to these essays (which on the whole are complimentary to me) I felt assured were from the pen of the Rev. Mr Clarke, as well as the papers on the Russian gold-fields. My aim all along had been to extract from the Rev. Mr Clarke, without favour, an opinion of some kind on my theory, for I believed him to be at the time the most capable of any man to judge of it. His opinions and Murchison's were, I presumed, identical on the question of gold at one time, but his more recent explorations upon partly developed gold-fields, conjoined with his scientific training, must, I thought, have exposed to him the falsity of many propositions previously adopted in scientific circles, and while I had no wish coarsely to expose the previous ignorance of men of science, including even the Rev. Mr Clarke himself, I felt quite satisfied with this anonymous and apparently sincere approval of my theory.

The letter of inquiry addressed to the editor of the 'Empire' thus states the case :

> SIR,—In the Catalogue of the natural products of New South Wales, intended for the Paris Exhibition, the well-known indefatigable geologist and chief contributor of mineral specimens, in describing his collection at page 42, takes the opportunity of stating, after some experience, and from a thorough acquaintance with nearly the whole of the colony, *as his opinion respecting the age of its gold*, that "its formation has taken place in rocks of the Silurian, Devonian, and Carboniferous eras, and in rocks whose dislocations have taken place from the end of the Silurian deposit to the Permian epoch." The apparent and more literal meaning of which remark seems to be that the age of the gold formation is contemporary with, or the production of gold has been simultaneous with, that of those geologically ancient rock formations.
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> But on comparing this opinion with another in 'Siluria,' page 445, it is seen that a totally different interpretation may be put upon the above ambiguous passage. Sir R. Murchison states "that no secondary formation contains veinstones charged with any notable quantity of gold, and that when the metal is found *in situ* it is either in metamorphosed strata of *Silurian, Devonian,* and *Carboniferous* age, or in associated eruptive rocks. Now it would seem as if these rocks must, in the Ural, have been chiefly *impregnated with gold* in a *comparatively modern* geological period. In the first place the western flank of the Ural chain offers strong evidence that this golden transfusion *had not* been effected in this region when the *Permian deposits were completed.* During that period vast heaps of pebbles and sand, all derived from a pre-existing Ural chain, were spread out over the lower country on the west; but nowhere does it contain visible traces of gold or platinum. Had those metals then existed in the Ural Mountains in the quantities which now prevail, many remnants of them must have been washed down together with the other rocks and minerals, and have formed part of the old Permian conglomerates."
>
> Query—What is the Rev. W. B. Clarke's opinion of the geological age of the gold in the colony? If he agree with the above quoted view of an *after* impregnation with gold of those ancient rocks, then he has not in the

Catalogue expressed any opinion at all respecting the age of gold in the colony, or of the relative time at which these ancient rocks were impregnated with gold in New South Wales. The gold of the colony may then, according to this view, be of any subsequent age, and the impregnations may have happened at any time during the long periods included partially in the Palæozoic, in all the Secondary, in all the Tertiary, and in the more recent epochs before the deposit of the alluvial beds in the auriferous districts which the exhibitor has examined and tabulated with a separate intention.

If it be intended to say that the gold is of contemporary formation with those ancient rocks, it is an opinion so widely at variance with the views entertained by most other authorities, that it is very desirable the ambiguity should be removed; the opinion as it now stands reminds us, involuntarily, of the artifice of the Vicar of Wakefield, who, whenever his family determined upon an undertaking of doubtful success, ejaculated the prayer, "God grant that we may all be the better for it this day twelvemonths," which, according to eventual success or failure, might be considered either as a prophetic warning, or as a pious wish fulfilled.

The inquiry is not made in wanton criticism, the question suggests itself to every reader; and since the diffusion of knowledge is one of chief object of the exhibitor, it is hoped that the people of the colony, of England, and of France, may be favoured with a more lucidly expressed opinion. I am, Sir, &c.,

INVESTIGATOR.

The papers on the "Gold Fields of the Russian Empire" already mentioned as being partly derived from the writing of Sir Roderick Murchison may, in substance, be represented here by the following further quotations from 'Siluria.' The author, at page 443, observes that: "In some spots the alluvium in which the gold occurs is a heavy clay, in others it is made up of fragments of quartz veins, chloritic and talcose schist and greenstone, which lie upon the sides of the hillocks of eruptive rocks. It was from the infillings of one of the gravelly depressions between these elevations, south of Miask, that the largest lump of solid gold was found, of which at that time (1824) there was any record."

"No watercourse sufficiently powerful to transport a single block, much less to spread out broad accumulations of such coarse material, now flows into this upland depression. Nor could the action, during millions of years, of such an agency as that of the puny rivulets which now meander in parts of the gravel account for the eroded and highly worn rocks, whether crystalline limestones, quartz rocks, greenstone, porphyry, or serpentine. We are thus necessarily compelled, by numerous evidences, to adopt the belief that on the Asiatic side of the Ural, as in many parts of Europe, the translation of vast masses of drift was accompanied by powerful and long-continued aqueous abrasion of the summits and slopes of the adjacent auriferous hills."

"Whatever may have been the period *when the rock was first rendered auriferous, the date of this great superficial distribution of the gold is clearly indicated*; for it contains in many places the same remains of extinct fossil quadrupeds that are found in the coarse drift-gravel of Western Europe. The Elephas primigenus or mammoth, bosaurochs, rhinoceros, tichorhinus, with gigantic stags and many other species, including even large carnivores, were, unquestionably, before that period of destruction, the denizens of Europe and Siberia; and of these the bosaurochs is the only one which has been preserved to our days.

"Before we quit the consideration of the Ural Mountains the reader may be reminded that, throughout the length of 500 miles, the rocks are auriferous at wide intervals and in limited patches only. Having clearly marked the geological period of the superficial gold drift, let me also here advert to a suggestion of my associates and self concerning the period at which the rocks were impregnated with gold. It has been already stated no secondary formation contains veinstones charged with any notable quantity of gold, and that when the metal is found *in situ*, it is either in metamorphosed strata of Silurian, Devonian, and Carboniferous age or in associated eruptive rocks. Now, it would seem as if these rocks must, in the Ural, have been chiefly impregnated with gold in a comparatively modern geological period. In the first place the western flank of the Ural chain offers strong evidence that *this golden transfusion had not been effected in this region when the Permian deposits were completed.* During that period, vast heaps of pebbles and sand, all derived from a pre-existing Ural chain (the older stratified rocks of which had even then undergone much change) were spread out over the lower country on the west, together with fragments of all the rocks, sedimentary or igneous, which are known in the chain. Specimens of magnetic iron and of copper ore, which so abound in the range, are not uncommon in this Permian *débris;* but nowhere does it contain visible traces of gold or platinum. Had those metals then existed in the Ural mountains, in the quantities which now prevail, many remnants of them must have been washed down together with the other rocks and minerals, and have formed part of the old Permian conglomerates. On the other hand, when the more modern debacles that destroyed the great animals, and heaped up the piles of gravel above described, proceeded from this chain, then the *débris* became largely auriferous. It is manifest, therefore, that the principal impregnation of the rocks with gold—*i. e.*, when the chief lumps and strings were formed—took place during the intervening time."

"What, then, was probably the geological period when these rich auriferous impregnations of the Uralian rocks took place? We cannot believe that it occurred shortly after the Permian era, nor even when any of the secondary rocks were forming; since no golden *débris* is found even in any of the older tertiary grits and sands which occur on the Siberian flank of the chain. *If, then, the mammoth drift be the oldest mass of detritus in which gold occurs abundantly*, not only in the Ural, but in many parts of the world, we are led to believe that this noble metal, though for the most part formed in ancient crystalline rocks, or in the igneous rocks which penetrated them, was only abundantly imparted to them at a comparatively recent period—*i. e.*, a short time (in geological language) before the epoch when the very powerful and general denudations took place which destroyed the large extinct mammalia.

"That the gold which occurs in quartz veins in the solid slate rocks resulted from an interior agency, in which the heat and electricity were combined with water or vapour, seems to be a natural conclusion, if we judge from the appearance which the strings and expansions of the metal indicate as they ramify through the chinks of the hard rock, or are diffused in grains in its mass. We may also suppose that the prevalent matrix of quartz, whether ejected from beneath or poured in from above, was in a soft and gelatinous state when it filled the cavities, resembling the silicious 'sinter' which now rises in a fluid spout from Hecla, and falling coagulates into a modern quartz rock around the volcanic orifice.

"In viewing the widely attested fact of the dispersion of auriferous *débris* derived from the surface of certain rocks during some of their last great denudations, we are naturally led to favour the suggestion of Humboldt, that the formation of gold had some closer relation to or dependence upon the atmosphere than that of the baser metals, lead, copper, and iron. An eminent metallurgist, Dr Percy, who has detected minute quantities of gold in almost all lead ores, is, indeed, disposed to believe that it may have been thrown down by deposition from an aqueous medium."

And again, the one or more authors of the principles expounded in 'Siluria' thus write, in conclusion, page 456:

"In defining the general character of the most productive auriferous rocks, the geologist must, however, necessarily admit a considerable number of exceptions to any prevailing rule. For, whilst the chemist, as before said, has recently detected traces of gold in lead and copper ores,—a discovery of considerable interest, doubtless, in regard to the theory of the origin of the precious metal,—the researches of the miner teach us that, in any auriferous region where certain quartzose lodes are surcharged with ores of iron, particularly the orides and sulphurets, there *some* amount of small particles of gold will probably be found. Again, the diffusion or dissemination of small particles of gold throughout the body of various rocks, both of igneous and aqueous origin, is, as before said, a phenomenon dwelt upon by certain authors. Humboldt, indeed, asserted long since, that in Guiana '*gold like tin is sometimes disseminated in an almost imperceptible manner in the mass itself of the granite rocks, without the ramification or interlacing of any small veins.*' In Mexico the gold-mine of Guadalupe y Calvo was in porphyry. In Australia (districts of Braidwood and others south of Sydney), *a peculiar variety of felspathic granite is described by the Rev. Mr Clarke as being permeated by small particles of gold;* whilst in Siberia Hoffman had some years before spoken of its distribution in such *minute quantities in clay-slate,* that it was only by pounding up large lumps of the rock that any perceptible quantity could be extracted.

"In all regions, therefore, where such rocks occur, we may find gold either in the coarse *débris* or the fine alluvia resulting from their decomposition. Felspar and quartz being their chief component parts, we can easily imagine how their former destruction on a great scale would leave as a residue large heaps of that pipeclay (the decomposed felspar), or those gritty pebbles (the abraded quartz), which, with the accompanying ores of iron (particularly the black magnetic oxide), are so frequently the gold-bearing matrices in the drift of auriferous countries. But whilst it is an admitted fact, that gold has sometimes been so diffused in minute and imperceptible particles in certain rocks, we have yet to learn whether such diffusion extends far downwards into the body of any mountain. Even if it be so, the extraction of ore so diffused might, if the rocks were hard, prove too costly an operation. *At all events the indisputable fact is that the chief quantities of gold, including all the considerable lumps and pepitas, having been originally imbedded in the upper parts of the veinstones, have been broken up and transported with the débris of the mountain tops into slopes and adjacent valleys.*"

Several official reports of the Rev. Mr Clarke, in which gold is repeatedly stated to have been derived from a granite matrix, are alluded to in the above extracts from 'Siluria,' and republished in APPENDIX D, for reference by the reader, and in fairness to the author of them, since the question has become a controverted matter.

The hornblendic granites, however, more than the felspathic granites, are considered by the Rev. Mr Clarke to be especially connected with gold. The reports upon Goodgood and its neighbourhood, already printed in Part Third, also contain statements of opinion to the effect that alluvial gold has there been derived from a granite matrix. It was unquestionably, at that time, the opinion of the Rev. Mr Clarke that in some localities alluvial gold owed its origin to the destruction of a granite matrix, which he supposed to have originally contained the metal diffused within it in visible particles; whilst Sir Roderick Murchison, upon the alleged authority of Humboldt, in the passage just quoted, says it is an admitted fact that gold is disseminated in an almost imperceptible manner in the mass itself of the granite rock, *without the ramification of any small veins*, and elsewhere relates that gold is similarly disseminated in clay slates, schists, and limestones through the mass of the rock. The author of 'Siluria' at length concludes by stating it to be an *indisputable fact* that all the considerable lumps of gold *having been originally imbedded in the upper part of the veinstones, have been broken up and transported into adjacent valleys.* It was, however, the alleged indisputable facts, which, upon the authority of my own experience, I did dispute in my two first public letters, while the alleged admitted fact of dissemination is more especially called in question by the two next following public letters.

The Rev. Mr Clarke also, in 1851, a short time after the discovery of gold by Mr Hargraves, remarked in some complimentary language, in a small pamphlet called 'Plain Statements respecting Gold in Australia,' that but for Mr Hargraves "the gold that is now being brought to light might have rested yet a little longer undisturbed in the schists, and quartzites, and alluvia of the Macquarrie," when in truth Mr Hargraves never did find any gold whatever in the "schists and quartzites," but only in the alluvia or placer deposits upon them. In this passage, as in many others, the Rev. Mr Clarke at that time obviously believed schists as well as granites and slates to be matrices when not intersected by quartz veins, and therefore concluded that from the whole mass of such imaginary matrices, as well as from auriferous quartz veins, alluvial gold had been derived by their being broken up and deposited as *débris* in adjacent valleys.

The FIFTH PUBLIC LETTER I thus addressed to the Editor of the 'Empire,' on the subject of THE GEOLOGICAL AGE AND ORIGIN OF GOLD.

SIR,—In a contemporary local journal some compilations and translations have lately appeared concerning the gold-fields of the Russian Empire; the writer of them has, I perceive, embraced the conclusion which now is generally believed to be correct, namely, that "gold is a most recent mineral substance and the least distant in point of time from the historic epoch," yet I observe that the nearly exploded error, which I have lately attacked respecting its origin in alluvia, is nevertheless still retained by him.

Although some eminent men of great ability, who have yet possessed but slender knowledge of the appearance of alluvial gold in its natural bedding place, have favoured the supposition that the gold grains have been mostly released from auriferous quartz veins and granites pulverised by abrasion and atmospheric action, and the metal then mechanically deposited by water, yet the whole phenomena of the richer gold-fields can never be reconciled with that assumption, whilst an early belief in the more probable counter-theory led directly to, and was further confirmed by, the alluvial gold discoveries in Australia. According to my observations there are in the richer gold-fields of both California and Australia abundant evidences that alluvial gold has chiefly been derived from a highly heated horizontally spread liquid and often melted into its moulds—an induction which is especially evident from the flattened gold of slates; the flattened or flaky condition of the gold grains resting upon them being so universal that every unprejudiced mind familiar with it cannot avoid relinquishing the quartz-vein-and-granite-disintegration notion.

It is highly probable that alluvial gold would have been sooner discovered in Australia, and sounder views might be now entertained of its origin, had less been written in times past respecting imaginary auriferous quartz veins in supposed ancient mountain tops, which are assumed to have been destroyed by a conjectured abrasion or an inconceivable atmospheric action, and therefore surmised to have originated alluvial gold in the depressions of the Ural chain—for these untenable hypotheses chiefly resulted from an examination of those mountains. It is better to know little than to have the mind crowded with a useless load of false prejudices: it is proverbial amongst Australian squatters that men accustomed in England to sheep management make the worst colonial sheep farmers, they have so much to *unlearn* before becoming willing to adopt other systems. It is ever a hard task to unsettle deeply-rooted prejudices; while the mere scholastically learned writers on gold too frequently conceal the want of particular knowledge in a display of general erudition.

It is historically interesting to learn what others before us may have thought on the subject of the origin of gold, and to follow the reasonings of former observers in their endeavour to unravel the tangled phenomena of nature ; but a thousand authorities cannot alter one physical fact. A modern chemist would not refer as to an authority to the doctrine of an ancient philosopher that earth, air, fire, and water were the only four elements, though he might feel an interest in those early researches and perceive in them the working of a powerful mind unable, with the means at command, to distinguish physical truths from errors of judgment.

All the facts recorded by geologists are valuable as information, but their inferences are by no means equally so ; and nearly all who have written on the subject of gold have begged the question, and started from the unwarrantable assumption that alluvial gold has been chiefly derived from the destruction of ancient quartz-veins, granites, and like indurated rocks, the several writers attributing its presence in alluvia to aqueous abrasion, or to atmospheric action, or to steam, or to gases, or to a volcanic destruction of rocks that never had any gold in them, or as a last resource, to a formation there by mysterious and inexplicable electrical forces ; while some who have written voluminously on many localities, by prudently adopting at different times something of each hypothesis, have constantly on hand a variety of passages that may be pointed out as proofs of a previous knowledge, whenever any generalisation is afterwards accepted ; it is only when comprehensive conclusions have been hazarded that inconsistencies can be detected.

The scattered conjectures of descriptive writers are no doubt very numerous, but the 'Lectures on Gold' of the Geological Society may be regarded as an epitome of all that has yet been accepted as probable in the highest scientific quarters. On reading these a short time ago it seemed to me that there was a deficient knowledge of the facts, and much prejudice asserted respecting the origin of gold in alluvia that could not be admitted as probable, and therefore, at Mr Hargraves's request, I roughly sketched for him the outlines of my particular theory. Sir Roderick Murchison's 'Siluria' has in the interim been published in England, and though the work throughout is tinged with its author's peculiar idiosyncrasy, it briefly sums up all the scientific ideas on the origin of gold, entertained up to that time amongst the geologically learned, and the amended opinions of its author are upon the whole more confirmatory of my views than could at the time of its publication have been expected from that quarter.

The translator of Viscomte d'Archaic and the compiler of other men's opinions affirms that "all writers attribute to *atmospheric action* the successive destruction of the summit of the Ural chain and the accumulation of the *débris* in the valley below, and that it is in these depressions that we find the alluvia or auriferous and platiniferous deposits, the *débris of veins* which were enclosed in the rocks of the mountain-tops, and which nature has taken the trouble to pulverise and to offer to man in the state most favourable for working." This statement is but the reiteration of an exploded opinion that "all writers" are abandoning with all the decent haste they possibly can; and three of the authorities mentioned are themselves more or less exceptions to all writers; there is, firstly, M. Engelman, who thinks "that the destruction of the rocks which have given rise to the auriferous alluvia is by far too considerable to be attributed solely to the action of atmospheric phenomena, he therefore has recourse to steam." This is one exception, and M. Engelman is right in thinking that the atmospheric-agency-conjecture supposes an insufficient agent for so considerable a destruction.

Secondly, Humboldt, who relates and remarks, that "In the Chorapampa (Peru) there has been found, near the surface of the earth, a rich mass of pure gold, spun round as it were with threads of silver; this fact proves how slight may be the affinity between many of the ores *upheaved from the interior of the earth through fissures and veins*, and the nature of the adjacent rock, and how little relative antiquity exists between them and that of the formation they have broken through." This passage is surely more reconcilable with my theory of an unusually friable matrix, than with that of "all writers;" for delicate threads of silver do not indicate either adhesion to a hard matrix, or a release by great destructive force.

And lastly, Sir R. Murchison, in his late revised opinions, approaches so closely to the theory I had already written before 'Siluria' appeared, that in the next edition it is not unlikely he may adopt it altogether. He sees and treats with some candour the difficulties of the erroneous position he unluckily took at first, the natural conclusion of a biassed palæontologist, whose ruling ideas were of fossils, drifts and denudations; he will yet demolish his own "ideal representation of an auriferous quartz-vein" as well as the opinions of "all writers" with whom he distinctly disagrees in 'Siluria,' where he says, "we are necessarily compelled, by numerous evidences, to adopt the belief that, on the Asiatic side of the Ural, as in many parts of Europe, the translation of vast masses of drift was accompanied by powerful and long continued *aqueous abrasion* of the summits and slopes of the adjacent *auriferous* hills." This powerful aqueous abrasion is by no means a destruction by *atmospheric agency* that all writers are agreed upon, for we are told in a passage just before, that the action during millions of years, of such an agency as that of the present puny rivulets (with all other ordinary aids of atmospheric action to boot), could not account for the highly worn surfaces of the rocks.

Again that Author writes—"An eminent metallurgist, Dr Percy, is indeed disposed to believe that it (gold) may have been thrown down by deposition from an aqueous medium."—I have already attempted to explain, more especially in my second letter on the origin of gold before Dr Percy's opinion was published, that alluvial gold has apparently been thrown to the bottom of some liquid matter horizontally spread; but that it has been an aqueous medium at ordinary temperature cannot be admitted to be probable. It is very apparent, however, from the above quoted passage, that Sir R. I. Murchison only wants the authority of eminent metallurgists, sound chemists, and natural philosophers, to assure him of the possibility of its separation from a surface-spread solvent, and he will at once acknowledge that the geological relations of alluvial gold are more compatible with such an origin than with that by abrasion from quartz-rock.

And to show how very doubtful the author of 'Siluria' is of his own hypothesis, after all he has advanced in favour of it, he writes, "That the gold which occurred in quartz-veins in the solid slate rocks resulted from an interior agency, in which heat and electricity were combined with water and vapour, seems to be a natural conclusion. . . . . We may also suppose that the prevalent matrix of quartz, whether *ejected from beneath or poured in from above*, was in a soft and gelatinous state when it filled the cavities." It is then possible, even in the opinion of Sir R. Murchison, that the auriferous quartz matrix may have been *poured in from above*, if so, it is then a natural conclusion that some of it would be left behind, spread on the earth's surface without entering the fissure at all, and that probable derivation from a surface-spread liquid is exactly my theory, the quartz which rolled along the surface having, as I suppose, solidified in globular shapes. There is no very great reason for supposing that the quartz continued in a soft or gelatinous state, it is equally probable that the auriferous quartz was never long in any intermediate condition between liquidity and solidity; and let me be distinctly understood as not favouring the supposition that the auriferous matter was melted into quartz-veins *from above*—it was, as I think, ejected *from beneath*, and when the auriferous solvent overflowed and was horizontally spread, metallic gold separated and aggregated, and then often was melted into the moulds beneath it.

That heat and electricity were in combination with the erupted auriferous matter is quite certain, when we admit the general truths that "heat in a latent or sensible state exists in all bodies," while cold is but a relative term,—and that "electricity is roused from its latent state by every change in the mechanical or chemical condition of matter." That some vapours, and what chemists call "water of combination," may also have been included in the mixture is highly probable. But these considerations are quite secondary to the more palpable facts that the auriferous matter resulting from an interior agency, which conveyed gold as well into the quartz-veins as into the placer deposits, must have been in *a liquid state*, and mixed with another imponderable agent, known as luminosity, incandescence, or light.

Dr Ure, in his 'Dictionary of Arts and Sciences,' observes, that "The gold districts of Hungary, Transylvania, and Equatorial America have impressed all mineralogists with the evidences of the action of volcanic fire. It is certain that the trachytes, which form the principal portion of the rocks, are now almost universally regarded as of igneous or volcanic origin; it would seem, however, that the primary source of the gold is not in these rocks, but rather in the syenite and greenstone porphyries below them."

There are also auriferous districts in California and Australia which impress all diggers with the evidences of alluvial and horizontally distributed gold having been melted *in situ*, and there are unabraded nuggets of alluvial gold to be seen in cabinets which impress all beholders with the evidences of having suffered no attrition since they were melted. It is strange that the mere conjecture of a powerful destructive force of abrasion should weigh against the evidences and opinions of all mineralogists, diggers, and people in general. In my opinion, both alluvial and quartz matrix gold did arrive in those districts, and everywhere else, in a perishable flood of probably trachytic constituents,—in an intensely heated menstruum of aluminous, siliceous, and alkaline ingredients, which separated its parts after release from pressure, aided by the chemical affinities of its constituents changing and reacting during refrigeration; the gold simply *rests upon* the crystalline rocks below, or is contained in their fissures, whence the auriferous solvent has issued.

It is a law of chemistry that "the attraction which dissimilar atoms have for each other, at lower degrees of heat, is different from that which they have at a higher temperature;" thus at an ordinary temperature *sodium*, and like alkaline bases, will attract oxygen from every known compound, but sodium is itself obtained by exposing soda with iron filings to an intense heat; at that high temperature common iron has the greater affinity for oxygen, and overmasters the then feebler affinity of sodium. It is in this manner that gold has been released during a descending temperature from combinations in a highly heated liquid.

Water, under a pressure of one atmosphere, cannot be heated above 212 degrees, but under great pressure water may be heated above incandescence;—limestone heated under ordinary circumstances is resolved into its constituents, lime and carbonic acid, but under confinement limestone may be fused without separation of its parts; so it appears to me inferentially have the auriferous molten masses been heated, and fused under subterranean pressure; the parts have separated, and the auriferous particles in atomic suspension have aggregated, chiefly after emission, and in part near the earth's surface in the upper portion of some of the fissures of issue.

Gold is remarkably indifferent to oxygen, but possesses peculiar chemical relations to chlorine gas, to haloid salts, and to alkaline sulphides. These will all form very perishable compounds, and this circumstance, together with their invariable attendance on recent volcanic emanations and their abundant presence in the ocean, leads to the inference that they also have formed a portion of the perished auriferous solvent.

The salt in the sea (the chloride of sodium, an haloid salt) is believed by many eminent philosophers to be of volcanic origin. Sir H. Davy, Baron Humboldt, and Dr Daubeny have each given considerable credence to this theory: among modern geologists, Lieut.-Colonel Portlock, President of the Geological Society of Dublin, observes that "chlorine united with hydrogen, as hydrochloric acid, is evolved from volcanoes . . . the quantity of salt in the sea is about one-sixteenth part of the bulk of the actually protruding or dry land . . . there appears to be good reason for assuming, with some philosophers, that sodium, potassium, and other metallic bases were important original constituents of the nucleus of the earth, and that by their sudden combination with chlorine and other gases, they produced some at least of the convulsive disturbances of its crust." The constituents of alkaline sulphides (sulphur, soda, &c.), and various metallic chlorides, also invariably accompany recent emissions from the earth's interior; and I think that gold may have accompanied these discharges during a particular epoch, and that separating in the metallic state, it has sunk to the bottom of the horizontally spread menstruum, while the more soluble salts have found their way into the sea, and the more insoluble and friable materials have crumbled into clayey and earthy debris.

It is a law of natural philosophy that, though gases mutually permeate each other and diffuse themselves, liquids, when they do not exercise a chemical action on each other, obey the ordinary laws of gravity, and arrange themselves in strata, in the order of their density, as quicksilver will do in water. The principle of liquid metallic separations from fluids is illustrated when phosphorous acid is added to a solution of oxide of mercury, then globules of liquid metallic mercury will subside to the bottom, and in a similar way, when the chemical affinity of gold to ingredients in the lava solvent ceased during a descending temperature, and the metal aggregated in globules from a state of atomic suspension, gold has subsided, because of its density, to the bottom, in drops, as mercury will do in water, and the golden drops solidifying about the same time, alluvial gold has been left in such shapes as are now found.

In fusing iron ore the reduced metal descends by reason of its greater density and collects at the bottom; while the slag forms a stratum above;—in glass-making a *glass-gall*, consisting of chlorides, oxides, and sulphates of sodium or other alkaline bases, *floats over* the melted and intensely heated glass. In this manner the auriferous lavas have separated into strata. In the first place gold has subsided, like iron in the furnace, or like globules of mercury in cold solutions; secondly, there has been a very friable aluminous slag, or scoria. like the slag of smelting works; and lastly, perishable salts like the gall of glass factories.

When the parts of molten and moving matter horizontally distributed were separable, the solidification of liquids in their separated state has not been confined to gold, but has extended to rounded quartz and trap pebbles and boulders (an original solidification or a tendency to decay in spheroidal shapes is common to many igneous rocks), and the round pebbles and boulders have since been considerably intermixed with fragmentary rocks and fossils by cataclysmal and aqueous agency, while, at the time the round pebbles were formed, the menstruum also may have contained newly torn up and unfused fragments of rocks mechanically suspended.

Alluvial gold is the product of a peculiar lava or trappean overflow, while the auriferous discharges appear to belong to a particular epoch, and to have differed from existing indurated traps and volcanic productions, chiefly in quantitative relation of ingredients; they have been emitted at a temperature, and under conditions favourable to a separation of parts, and have mostly filled pre-existing basins, valleys, gutters, and watercourses. Future researches ought, therefore, to be made with reference to analogies in chemistry, natural philosophy, and geognosy, rather than confined to the palæontological department of geology. Alluvial gold is now admitted to be a recent production spread only beneath the superficial drifts that have never been covered by marine deposits, and which rest only upon hypogene, and erupted rocks, and upon metamorphosed primary fossiliferous formations, in localities where secondary and tertiary sedimentary formations are wanting; therefore the additional knowledge respecting gold to be obtained by examining the fossils in the auriferous drifts is but limited in its application; for by means of aqueous disturbance, fossils of an age both anterior and posterior to the gold deposits have been mixed in the superficial debris superimposed on the metallic stratum. The pieces of wood and charcoal found at considerable depths in the auriferous debris at Ballaarat and the Turon, and the bones of extinct pachyderms found in the auriferous alluvia of the several gold-producing countries, may both have lived and been placed there after the metallic deposits; and although some transported rounded pebbles found in the auriferous drift of the Turon contain the shells of mollusks, these most probably lived, as possibly might also the pachyderms, before the epoch of the formation of gold deposits, and their fossil remains only have been afterwards transported to those places. Foreign drift has sometimes been brought to the gold deposits, but the metal itself has never been driven to any great distance from the spots where it originated.

The alleged dissemination of gold through the mass in granites and schists is thought by some persons to be an objection to the belief that alluvial gold has been derived from, and thrown to the bottom in a surface-spread heated liquid; at another opportunity I trust to be able to show that the presence of gold upon granites and schists is a circumstance highly confirmatory of it. I am, &c.,

23rd January, 1855. SIMPSON DAVISON.

The foregoing essay was immediately followed by a SIXTH PUBLIC LETTER, thus treating of THE ORIGIN OF ALLUVIAL GOLD :

SIR,—There is a radical error commonly entertained concerning the formation of gold, which has been much encouraged by, if indeed it did not originate in, the writings of two renowned geological explorers —an error which has an important bearing on the question of its origin in alluvia; it is the mistaken inference that visible gold is contained in certain granites, schists, clayslates, and limestones *disseminated through the mass;* and it is curious to trace the manner in which such errors commence, grow into belief, and become propagated and perpetuated.

In 'Russia and the Ural,' Sir R. Murchison says, it is supposed gold may have existed before disintegration, not only in veins but also disseminated in granites, schists, clayslates, and limestones, throughout the whole body of the rock, whether of igneous or aqueous origin. Some few years afterwards the Rev. W. B. Clarke, a disciple of the same school, and justly a great admirer of that distinguished palæontologist, taking from him this cue so convenient for a particular hypothesis, proceeds to examine the gold-fields of New South Wales, and obtains granite specimens with exceedingly minute gold attached to them from *near the upper surfaces* of massive granites, which, of course, seems to confirm the supposition; then 'Siluria' comes out, and in it Sir R. Murchison states that "*from Mr Clarke,* and other authors, we learn that there are tracts wherein gold is diffused in small and often imperceptible particles through the body of certain granitic rocks—a circumstance I have already mentioned—see 'Russia and the Ural.'"

Again, lately in a local newspaper, a writer on gold relates that M. Hoffmann found gold in Russia disseminated *in great masses of argillaceous schists,* yet forgets to notice the very important fact, that the gold reported as existing in the schists was only *in the invisible state,* thus leaving the reader to wrongly infer that it might have been in visible grains like alluvial gold. It is stated in 'Siluria' that "Colonel Hoffmann long ago indicated a tract in Siberia, where the schistose stratified rocks are equally permeated by the small diffused particles of the metal, imperceptible to the naked eye;"—it is almost superfluous to remind those persons who imagine that alluvial gold resulted from grinding-down processes, that the mechanical pulverisation of invisible gold never originated the larger grains and nuggets of alluvial gold.

To give a definition of "almost invisible" is not so easy as to draw the distinction between visible and invisible gold;—let us understand by alluvial gold the distinctly visible grains and larger lumps of the metal horizontally dispersed near the earth's surface; and by auriferous quartz veins, only those nearly vertical quartz veins which contain palpably visible gold, and exclude from present consideration those metalliferous veins whence gold, though not perceptible in them, may be extracted from their contained metallic oxides, sulphurets, or any other substance charged with the metal in an invisible condition, for these veins seem more to resemble the rectilinear lodes of baser metals, and are probably of quite a different constitution from the ordinary auriferous white quartz-veins.

In the first place, I deny altogether the alleged fact of the existence of visible gold of the character of alluvial gold, in equable dissemination through the mass, in any granites, schists, claystates, or limestones, and I deny that alluvial gold ever has been so disseminated. The testimony to that effect is but a mistaken inference drawn from observing the presence of gold at the top of these rocks in masses, and in some rare cases finding very minute particles attached to the granitic specimens; in no single instance has a dissemination through the body ever been proved, or even its probability reasonably shown, and when cross-examined on the subject all the witnesses affirmative of the existence of gold in that condition will admit that they noticed visible gold only near the top surfaces of these rocks and spread over large areas, and therefore *inferred* that the metal in a visible state might be disseminated through the whole masses. The veracity of the authors is not questioned, but they have erred in regarding as evidence what in reality was only mistaken inference, and their testimony only goes to show that alluvial gold was derived from an overflowing solvent.

I had mentioned, before 'Siluria' appeared, in my first letter on the origin of gold, that according to my observations it was a law of high generality that gold-bearing granites only contain gold near their exposed surfaces (when not in veinstones), and that the gold seldom reached a depth of two feet, and consequently did not extend throughout their masses; in an unpublished letter I had again dwelt at greater length on the subject, and offered the following explanation of the phenomenon of gold being in some rare cases found adhering to granites near their upper surfaces, and yet never being found united to slates and schists, viz.:—that when quartz in tranquillity and liquid gold have been in contact at a great heat, the liquid gold had, since the two substances possess some adhesive attraction for each other, spread upon and attached itself to quartz and more rarely to subjacent quartziferous granite; but when liquid gold had dropped upon, or come in contact with, crystalline schists or slates, since the metal possesses little or no adhesive attraction for those rocks, the force of homogeneous cohesion has caused the liquid metal to assume globular shapes (as we see quicksilver will do) which drops had then frequently entered into the mould beneath them by reason of their own weight and the pressure of the superincumbent mass; and had there been shaped and solidified without any adhesions taking place ; hence cabinet specimens of united gold and quartz are comparatively abundant,—specimens of granite with adhering gold much rarer; but since no adhesions have occurred between liquid gold and the underlying crystalline schists and slates, no cabinet specimens can be produced to illustrate this probable fact of gold having been melted into them; the evidence can only be witnessed in nature when diggers are removing the metal.

It is due to the author of 'Siluria' to quote the following passage : "But whilst it is an admitted fact that gold has sometimes been so diffused in minute and imperceptible particles in certain rocks (granites, &c.), we have yet to learn whether such diffusion *extends far downwards* into the body of the mountain." As already remarked, visible gold of the magnitude we call alluvial gold, certainly does not extend far downwards, and visible gold means tangible, palpable, and evident grains and lumps: the almost imperceptible gold I may classify among the invisible, for though no clear line of demarcation can be drawn between alluvial gold and almost invisible gold, the distinction is sufficiently broad to be easily understood, and there is no granular gold so diffused through the body of any granites or like indurated rocks; nor am I aware that either invisible or hardly perceptible gold is so diffused, but in all cases is most probably only present near their upper surfaces. That part of the question, however, may not have been sufficiently well investigated, and is foreign to my subject, the penetration of granites to greater depths, and chemical analyses can alone determine its invisible presence : abstractedly considered, it is a speculative inquiry not devoid of probability that some existing trappean rocks (including peculiar granites), may contain gold diffused through the body in an invisible or almost imperceptible condition, which may, in fact, be modifications of the once liquid auriferous solvent;—but the golden particles in such rocks (if there be any) are certainly not in the same state of aggregation that they are in alluvia;—the auriferous granites of the Rev. W. B Clarke (assuming hardly visible gold to be diffused through their masses, of which I am incredulous) offer no objection to my theory, for the almost invisible gold they are supposed to contain could not by pulverisation originate the larger grains and lumps in alluvia;—an equal diffusion of gold through the body of aqueous rocks of Silurian age in Russia is irreconcilable with the belief that the auriferous impregnations took place at a recent epoch, and the alleged diffusion is not sustained by the personal observation of Sir R. Murchison;—it is incredible that visible gold is so diffused in them at any distance downwards from the top, but it is probable that the gold having been only recently imparted to such rocks from an overflowing solvent, is present near their upper surfaces and may be invisible from its minute subdivision, but never an integral part of the mass.

It is stated, by Mr Stutchbury, that besides being in a quartz matrix gold has been found in Devon and Cornwall (England) in its original position in nests and veins, usually of small extent, in granite, porphyry, schist, &c. In all those cases it may be presumed that the nests rested only on the surface, and that the so-called veins (when not quartz veins) were simply linear deposits of alluvial gold, and, like all other alluvial gold deposits *in situ*, they resulted from an overflowing auriferous liquid.

Gold is said to have been found in Brazil in mica schist in which "spangles of gold replace the mica." Doubtless gold is there near the upper surface only, and if ever found adhering, possibly the subsequent permeation of some cementing substance may have caused an apparent exception to a general rule. At all events, in the many crystalline schists I have examined in auriferous districts, no such replacement was ever apparent, and in the reported cases, the "hardly perceptible" clause is mostly introduced; which of course excludes those schists from consideration as a matrix and probable origin of the large visible grains of alluvial gold.

That under some particular circumstances small visible gold may have been cemented to schists is perhaps not altogether beyond possibility. It is certainly exceptional, and I never saw any that could be considered as a portion of the mass. In addition to the evidence of my own observation, I may mention being once present when a discussion arose in California as to whether such things existed as "slate-veins of gold," which were defined as veins containing no white quartz, but having the gold visibly diffused in certain lines through slate-rock. No one had ever seen any of them, and the question was referred to a party of experienced gold-miners from the auriferous districts of Georgia, in the United States, who, having served in the Mexican war, had also some knowledge of the Mexican gold mines, yet these men neither knew of, nor believed in, anything of the kind. I proposed the same question to Mr Hosking, lately in the service of the Great Nugget Company, who had had some years of experience in the gold districts of Brazil, and also in gold-mining near Bogota, in the State of New Granada; he also was equally incredulous of the existence of visible gold as a part of the mass in slates. In all the reported cases of M. Hoffmann, Dr Trask, and others, of visible gold being an integral part of schists and slates, we may feel assured, then, that it has been found only near the top surfaces of those formations, or contiguous to the channels whence the gold has issued from the earth's interior.

But in challenging the evidence of others, let me narrate how my attention, at first, was more particularly directed to granites, before arriving at this conclusion respecting the absence of visible gold in dissemination through their masses; and the way my theory commenced and influenced in its incipiency the discovery of alluvial gold in Australia, and was further confirmed by the discovery at Ophir, and by the finding of gold at Goodgood, a locality which I had previously indicated to Mr Hargraves.

I had, before 1849, travelled over several of the gold-fields of New South Wales, and personally sought for gold with some diligence in the quartz veins on my sheep run of Goodgood, on various occasions during a residence there of two years, relying upon the hypothesis that alluvial gold is derived from the destruction of such veins when they occur in granite or schistose formations, but I never found any gold whatever in them. Afterwards, on reaching Wood's Creek in California, with Mr Hargraves, in 1849, the gold-diggers would point to the quartz-capped hills and say, "There's the matrix, white quartz is the mother of gold; from those hills all this alluvial gold has been derived." On inquiring of them how they knew it, the answer was, "Oh, all the great scientific men say that it is derived from the destruction of such rocks; it must therefore be so." But, in my prospecting rambles, I examined the said quartz-capped hills, and sought for gold in its supposed quartz matrix, merely out of curiosity, as no diggers then dreamt of working profitably in quartz. As I could never find the smallest particle of gold in the quartz rock, although it was abundant in the alluvia below, the suspicion naturally occurred that there must be some mistake about the matter. Shortly afterwards, at a distance from any quartz-vein, I selected a claim where the alluvia rested upon a bedding rock of slate; at that place the gold, of tolerably large circumference, was so remarkably flat, thin, and closely wedged into the deepest recesses of the slaty bedding rock, that I felt convinced mere mechanical and hydrodynamic agency could never alone have accomplished its deposition in that state, and then I first remarked to Mr Hargraves that the gold in that neighbourhood could never have been derived from pulverised quartz veins, but had evidently been melted into its slaty moulds. The inference naturally followed, that since alluvial gold was found in slates at Wood's Creek, which gold had not been derived from destroyed quartz-veins, it was very likely that alluvial gold might be in the very same sort of slates at Goodgood, where every other normal condition of a gold-field existed, though I could not when there, any more than at Wood's Creek, find any gold on examination of the quartz-veins. Therefore, when Mr Hargraves returned to the colony, I requested him to examine Goodgood again by the washing process, not supposing gold to be there in quantity worth returning expressly to find; and that inference is now proved to have been correct, for gold is not abundant in that vicinity, though its general presence is fully established, more particularly by the Rev. W. B. Clarke's geological report of the 17th of November, 1851.

Mr Hargraves himself, who despised theories in general, would frequently remark to me when in California, as certain specimens turned up, that my theory about slates must be true; and after his return to the colony in 1851, being led by circumstances to make his first trials at Ophir, where he recollected having seen both quartz and slates many years before, the only auriferous locality which he had ever seen in the colony, he sought for and found gold there upon *the slates*. The Colonial Gold Company near the same spot soon afterwards expended a considerable amount of labour and money in opening a quartz-vein which traverses the same creek in its richest part at Fitz Roy bar, in reliance upon the hypothesis that the natural pulverisation of quartz veins had originated alluvial gold, and they found no gold whatever, not a single speck, in the quartz-vein. There is, then, but little evidence of the pulverisation-conjecture either at Goodgood or at Ophir; the testimony is to the contrary. It is of course easy to say that there may once have been auriferous quartz-veins which have entirely disappeared, but that is merely assumption, and is mutely but irresistibly denied by the shape and appearance of numerous nuggets of alluvial gold. The prodigious destructive force required for the disintegration of such quartz-veins is inconceivable,—yet the supporters of the atmospheric-action-pulverisation hypothesis, whilst seeing an event which millions of years could not accomplish, will allow the gold impregnation of rocks to be a *recent* geological event bordering on the historic epoch. It is likewise an ingenious way of escaping a difficulty, after finding the quartz-veins are totally destitute of gold, though in the midst of rich gold-containing alluvia, to suppose that they are of an age quite unconnected with the auriferous epoch. Whenever the grinding-down and the melting-in inferences are applied to any great and rich districts to account for the origin of gold in alluvia, the balance of evidence is greatly in favour of the latter, and auriferous quartz-veins are merely the former openings whence the solvent in some cases has issued.

It is worth remarking how writers have lately been shifting their ground of argument. Not long ago quartz was esteemed the chief matrix; it is now found that quartz rock is too hard to be pulverised with such convenient facility; therefore imaginary matrices of friable granites and schists are more dwelt upon. But lately aqueous abrasion was considered the chief destructive agent; it is now found that any aqueous power, whether marine, fluvial, or cataclysmal, of sufficient force and duration to grind down quartz-veins and round the fragments, must have transported the quartz pebbles in aqueous suspension to a great distance from the gold, since their relative specific gravities are as 19 to 2½, therefore atmospheric action is the last weak position of these fugitive reasoners. The assumptions are all equally untenable; the supposed atmospheric destruction of imaginary granites and schists is just as unlikely to have originated alluvial gold as the conjectured aqueous abrasion of ideal quartz-veins.

Ridicule is not a legitimate weapon for attacking opinions which are amenable to reason alone; but really such vague guesses have been foisted upon public credulity, and by some means mistaken for scientific deductions, that almost any means may be fairly used in extirpating the extravagant falsities.

Mr E. W. Rudder, of the Macleay River in New South Wales, a gentleman who went to California as the representative of some Australian Gold-mining Company, wishing to try a certain patent gold-washing machine, accompanied Mr Hargraves and myself in a trading trip up the Sacramento River in 1850; and whilst Mr Hargraves, who never liked the task of prospecting, remained in charge of merchandise at Marysville, near the head of navigation, at the confluence of the Yuba and Feather Rivers, I went with Mr Rudder on a short expedition to the diggings on the Yuba, expressly to initiate him into the art of practical gold-mining. Mr Rudder had some theoretical opinions of the gold formation, and maintained that visible gold was disseminated through the massive granite near Foster's bar. I contested the assertion, and we severally washed many dishes of granite, carefully pounded and obtained from the large granite boulders in the river, for the purpose of determining this question. I have since had ample opportunity and given close attention to the inquiry, because if the assertion were sustained by evidence it must have necessarily shaken my conviction respecting the melting of gold upon slates, and I am satisfied that visible gold, besides intersecting it in veinstones, rests only upon the surface of granites, and enters their interstices in the same way that it does upon slate formations, being only in some rare cases attached to the granites for the reasons already given.

Humboldt not only thought that gold is of recent formation, an opinion since confirmed by Sir R. Murchison's examination of the Ural, but (as is merely noticed in a passing way in 'Siluria') he made the significant suggestion, which deserves to be printed in capital letters, and repeated on every page, that "*the formation of gold had some closer relation to or dependence upon the atmosphere than that of the baser metals;*" and had that able cosmographist possessed the additional advantage of being a gold-digger, and practised removing the metal from slates with his own hands, he would not merely have discovered the fact of the derivation of alluvial gold from a hot liquid, expanded under the atmosphere, but from that datum his capacious mind would have drawn important conclusions respecting the constitution of the earth, to which a knowledge of the fact must inevitably lead. The close connection of gold with the atmosphere is unquestionable. An intensely-heated auriferous fluid, after release from subterranean pressure, would immediately commence rapid refrigeration, and for both reasons the separation of parts and the aggregation of metallic particles would occur freely only when the highly-heated auriferous solvent became horizontally extended beneath the low pressure and temperature of the atmosphere, while the molten gold has, I think, often dropped in a liquid state into the moulds beneath it; but perhaps more frequently like water changing to hail in the atmosphere, the liquid gold has solidified before reaching its bedding place. My lessons have been read in the volume of nature rather than in the books of men, and my convictions are derived from a long gold-digging experience; but since they have not completely dispossessed the erroneous notions current in some scientific quarters, I am rejoiced to find them thus countenanced by the opinion of the greatest modern philosophers, and the testimony of all geologists, when duly sifted, confined to facts, and stripped of mistaken inferences, will lead to the same conclusions.

When the Rev. W. B. Clarke observed that " the whole question of the distribution of gold depends upon a more perfect knowledge than we at present possess of the natural history of trappean eruptions," a secret of nature was nearly brought to light, but fatal prepossessions imported from the Ural prevailed, and stifled the promising young idea in its incipiency. The remark may be applied in reversed order, and alluvial gold—a trappean product—the only abundant metal which has resisted, through the lapse of time, both oxydation and mineralisation, and still retains, unchanged, its pristine molten freshness—may be appealed to as a datum from which the natural history of peculiar trappean eruptions may be truly inferred; their temperature, nature, and associated ingredients may be learnt from a study of the chemical nature and physical relations of the unalterable noble metal; the history of past igneous phenomena may be read from this imperishable monument, just as geologists discover from the data of fossils and footprints the history of past geological epochs, and infer the relative age and order of position of ancient aqueous rocks;—and observers may find, in studying gold as distributed in nature, a corroboration of past terrestrial convulsions, as archæologists find vouchers of the history of past nations in the least perishable monuments of art which remain yet undestroyed on the plains of ancient Assyria and Egypt, when all other remains of human art have disappeared during national convulsions, or have perished by slow decay. For the petrified bodies of once living creatures, and the chisels of ancient sculptors, have not left evidence that attests the history of the past more legibly than the *prima facie* evidence of the fusion of alluvial gold *in situ* proves that the metal has been derived from a highly-heated horizontally-distributed lava, or trappean overflow. I have had fears that my theory might be anticipated, or an *à priori* knowledge might be asserted; luckily those fears have not been realised; the growing conviction of its truth in the minds of all impartial persons will become more firmly established in the course of time, as facts become better known.

Gold is generally allowed to be of recent production, the last formed of metals, and I concur in thinking the balance of evidence is in favour of this conclusion. Sir C. Lyell, however, as late as 1852, deems the affirmation rash in the present state of our inquiries. There are a few considerations which leave some doubt as to its formation being as recent as is commonly supposed, but the burden of proof is on the side of professed geologists; for the placer deposit gold spread on the earth's surface and derived from some overflowing heated liquid, near to apparent channels of issue which themselves contain gold only near the top, is presumed by plain gold-diggers to be a relatively recent deposit, and it is for those naturalists whose particular study is the solid crust of the earth to produce evidence to the contrary.

It is the opinion of Sir R. Murchison, founded upon observations made in Russia, and of the Rev. W. B. Clarke, after great geological experience in New South Wales, that the recent formation of gold has taken place in rocks of Silurian, Devonian, and Carboniferous ages. The opinion of both these able geologists is entitled to the highest consideration, and the conclusion may be incontrovertibly true of particular localities. The opinion may not be intended as universally applicable; if it be so intended, I demur to an acquiescence; my reminiscences of California, Victoria, and New South Wales do not sustain such a general conclusion, and the presence of gold veins in rock formations of those ages may be explained upon general considerations. At some future time I will attempt the explanation.

I am, Sir, &c.,

8th Feb. 1855. SIMPSON DAVISON.

POSTSCRIPT.—The explanations proposed in the last paragraph not being elsewhere given, I may here briefly state that I think it quite probable, considering the marked absence of fossils in the bed rock of any placer or notably rich alluvial gold deposit, that the formation of gold may have taken place chiefly upon rocks of *ante-Silurian* age, and this conclusion may be quite true, without negativing the allegation of the Rev. Mr Clarke, that in New South Wales the formation of gold has taken place in rocks as recent as those of the Carboniferous and the other next preceding geological ages enumerated by that author. My ideas were to this effect, that allowing the cosmographical doctrine of secular refrigeration, and the existing proofs of a succession of life from a beginning to be satisfactory, and that upon the flanks of a primordial axis of granite or like crystalline rock, which has since been obliterated or much obscured by subsequent eruptions, there reposes a stratigraphical series of sedimentary rocks in the successive order of unfossiliferous, Silurian, Devonian, Carboniferous, &c., and adopting the conclusion of physical geology, that continuous mountain chains are but the external and solid coverings of extensive and deep-seated fissures, which communicate with the molten interior of the earth; it would then seem (however since obscured by disturbance the primordial axis of the main range in Australia may be) that the subsequent gold-producing eruptions have occurred along the same meridional lines,—that is, have come up from beneath through the same extensive fissure; but as the auriferous eruptions would reach the surface only through the vertical lines of least resistance, it would depend entirely upon the degree of resistance of the superficial covering to guide the auriferous matter to its place of issue. The crystalline rocks above might frequently offer far greater resistance than the lateral fossiliferous rocks, hence I conclude that the greater bulk of placer deposit gold may have been spread upon ante-Silurian rocks, a good deal upon Silurian, still less upon Devonian, and the least of all upon Carboniferous rocks. But then, again, since there is no conclusive evidence that any of the eminently rich auriferous districts have been submerged beneath the ocean since the palæozoic epoch, a very wide margin of time is left for the first appearance of gold on the surface, and, in fact, its issue may or may not have been later than the Carboniferous epoch, while the metal is nevertheless not found resting upon the sedimentary rocks of later epochs in other districts, because the igneous outbursts connected with them have not been derived from the same deep-seated source.

Such considerations lead to the further induction that the glowing liquid interior of the globe (if such there be) is not composed of one homogeneous substance, but rather of concentric molten strata, of which that stratum which contained gold (allowing it to be the most recently erupted matter) has been the most deep-seated of any which secular refrigeration has yet brought to the exterior. *Auralogy* is a new science, which is destined, I am persuaded, to add to our knowledge of the physical constitution of the planet which we inhabit, as well as to elucidate obscure questions of cosmology in general.

The reader may perhaps have remarked that in the preceding letter I have said less upon the subject of dissemination of gold in limestones than in other alleged gold diffused rocks. The surmise appeared to be so entirely imaginary that I scarcely thought it necessary to refute it as regarded the colonies, for although in New South Wales there are small bands of limestones in those districts which in a broad sense are said to be auriferous, yet I know of no bed rock of limestone beneath any notably rich gold deposit. In California, and in Victoria likewise, the placer deposits are remarkable for the absence of massive limestones; I could not therefore dispute the general doctrine of gold dissemination in this rock from personal observation, but only remark that this rock did not seem connected with the gold deposits upon any of the richer gold-fields. It was then with no small pleasure that subsequently I found a description, dated in 1848, of the gold-fields of Borneo, where limestone appears to be the chief bed rock. The writer's observations, from quite an independent source, are so confirmatory of my views of the worthlessness of the *dissemination*-conjecture as relates to limestones, and of the doctrine of the derivation of alluvial gold from abraded veinstones, that I give the full account, and have italicised the two most important sentences. The volume whence the extract is taken is entitled

'SARAWAK.' By Hugh Low, Secretary to Rajah Sir James Brooke. (1848.)

"The gold is found in three situations: in crevices of *limestone* rocks, in alluvial soil, and in the sand and gravel of the rivers. It is found chiefly on the western and southern portions of the islands, but is not obtained in any quantity to the northward. Last year I accompanied Mr Brooke on a visit to the rocks. The place they were then working was about four miles inland from the river, and about that distance from Seniawau and Tundong. This place was called Battu Kaladi, and was a limestone hill about 200 feet in height, the surface of which was worn, like all the limestone rocks of the country, apparently by water, into ridges so sharp that it would have been exceedingly dangerous to have fallen upon them. Amongst these ridges were holes, very small continuations of which penetrated into the heart of the mountain, some of them being forty or more feet in depth. The only difficulty appeared to be in the labour of making the aperture sufficiently large to admit the miner; but this accomplished, on his descent he found the bottom, which invariably opened to a cave, covered with earth of a loamy nature. This, on being brought to the surface in baskets, was washed, and we were told produced a *beugkal* of gold (about one and three-quarters of an ounce) from each bushel of earth, from six to ten or twelve bushels being found in each cave, according to its size. It was accordingly a very gainful speculation, and the working of it was carried on by all the idle and poorer classes of the community of Sarawak, so much so that it was difficult to hire men for ordinary work. . . . . . .

"How the gold should be discovered in these fissures at all is very remarkable, and perhaps may afford a curious fact for the study of geologists and mineralogists; it cannot have descended from any place higher, as the caves are found on the highest as well as on the lowest parts of the surface of the flat-topped hill, *nor after repeated examinations of the limestone is the slightest trace of the metal discoverable in it;* the surface of the rock is but scantily furnished with earth, and that is of a vegetable nature. It is true that the whole of the soil of the surrounding district is alluvial, and strongly impregnated with gold, but not to nearly so great an extent as that found in the fissures above described, hence the soil in these differs in the relative quantities it contains. The golden shower into which Jupiter is fabled to have transformed himself appears to have fallen here. Antimony is found in a vein in the same rock, the fissures of which produced the gold above described.

"The gold which is found in alluvial soils is that of which the supply is most to be depended on. This is in Sarawak, found and worked in many places principally by the Chinese, though the Malays occasionally work it on a smaller scale. The earth in which it is found is a yellow clayey loam; this being removed to a series of large troughs, into which the water of a pond, previously dammed up for the purpose, is turned, the heavier particles of earth are removed; what remains is washed away by hand in small shallow wooden dishes, until nothing or very little but the pure gold remains—the refuse in melting that which is cleaned by the Chinese never exceeding the one thirty-second part. *It is not found in veins in any part of Sarawak*, but in small particles distributed through the soil, nor does it extend to any great depth. In particular cases the smaller grains are preferred by purchasers to the larger, as they are generally much cleaner than the latter, the crevices of the granulated particles of which render them more difficult to be thoroughly cleansed.

"The gold which is found in the river is of the same description as that last mentioned, and is probably washed from the alluvials during heavy rains. It is sought for by numberless Malays during the dry season, when the water of the river is low."

Instead of any direct reply to my propositions, there appeared in the same journal A FEW WORDS ON THE ORIGIN OF GOLD, as follows:

SIR,—Some curious theories have from time to time been propounded respecting the origin and deposit of the brilliant and valuable metal which has lately caused such an excitement in the civilised world One party supposes that gold has been disintegrated by aqueous abrasion from quartz veins, the process extending over an immense period of time. Another imagines that a gradual though almost imperceptible change is at present taking place in the gold-bearing formations, and that the gold is separated from its matrix by atmospheric influences. A third party is of opinion that gold has come to the surface of the earth accompanied by a perishable lava, of which every trace has now disappeared. I do not attach much importance to the value of either of the above-noted theories, still I will not disturb them at present, but simply enumerate a few ideas of my own on this very interesting subject, which are the fruit of eighteen months' experience and observation at various gold-fields in this colony and Victoria.

Whether quartz has had anything to do with the creation of gold is a very difficult matter to ascertain, and may possibly be a sealed question to the end of time. Quartz is generally termed the matrix of gold, but except it can be proved that gold originally was generated, or formed in and through the influence of quartz, I must submit that the term is not justified. But it is universally admitted that gold is now found in more intimate association with quartz than with any other stone. The reason seems obvious. Quartz is capable of more perfect liquefaction by igneous action than slate, sand-stone, trap-rock, or any other substance on gold-fields. I am of opinion that quartz in a liquefied state, by igneous action, has been the principal medium of conveying gold from a great depth to the surface of the earth. Quartz-veins have been found permeating schistose rocks at immense depths, but those gold-bearing quartz-veins which are rich in the precious metal below a moderate depth are very rare. Gold is a surface metal, and sinking through the bed-rock in alluvial working, seems more valuable for speculation than profit, except where some eccentric disruption has once taken place, in which case a stratum containing gold may be found below what appears to be the bed-rock, but which is not so in reality.

I deem it probable that, after the igneous action and the other tremendous subterraneous agencies employed by Divine Power had partially subsided, and the lately liquefied quartz assumed a semi-solid condition, but still retaining intense heat, the windows of the heavens were opened, and a deluge of rain poured down upon the burning earth. In such a case the consequences might easily be imagined. The heated quartz would explode and shatter into fragments wherever a heavy body of cold water would come into contact with it, the gold would be cleanly disintegrated from the quartz, and the innumerable nuggets and particles of gold would be hurled on by the water until they were successively deposited in their respective crevices. Judging from the appearance of Bendigo, I think the above theory is probable. That it is possible a very simple experiment will tend to show. Take a specimen of gold in quartz from a quartz-vein, heat it till it becomes red hot, then drop it into cold water, and the quartz will explode and leave the gold clean. Mr Babbage, of South Australia, performed an ingenious experiment to show the manner in which the nuggets of gold associated with quartz of a pebbly appearance, commonly termed specimens, found in alluvial workings, had probably been formed at the first. He broke up some *transparent* quartz into small pieces, and placed them in a vessel full of cold water. He then melted a small quantity of copper, and poured it into the vessel. The copper fused the particles of quartz together in a mass, and a copper and quartz nugget was the result, similar in appearance to an alluvial specimen on a gold-field; and the quartz in the process had been rendered opaque. In working at gold-bearing quartz on Bendigo I generally found the quartz richest in gold very brittle, rather transparent, and quite light when disengaged from the gold by a blow of the hammer. In different gullies on Bendigo quartz-veins may be traced perfectly distinct to and from a gully where they cross it at right angles, but in the gully within flood mark they are often cut through, showing, I think very plainly, that the quartz in a heated state had been exploded and removed from the spot by floods. Where the gold has remained in the quartz is generally on the hills, a considerable distance from the gullies, and therefore much less likely to be disintegrated from the quartz than where a large body of water gave vigour to the exploding power.

The subject is a large one,—and I have merely thrown out a few hints respecting it. I hope, however, that before long, by uniting practice and theory together, we will be enabled to give our children more correct ideas of the causes of the origin and deposit of gold than any of those that have been current. I am, Sir, &c.,

Sydney, February 10. A RETIRED GOLD-DIGGER.

To the foregoing 'Few Words' I referred as follows, in a SEVENTH PUBLIC LETTER, entitling it THE NATURAL GOLD FORMATIONS.

SIR,—I am induced to offer a few remarks in reply to the "Retired Gold-digger" respecting the origin and deposit of gold, since the tone of his letter indicates a love of truth, and while in words the writer attaches small importance to the theory about which I have lately addressed you, his admissions virtually concede the great principles for which I have contended when almost every recognised authority was in opposition.

In the eagerness to expound a great truth upon a difficult subject the unskilful in argument are apt to overshoot the mark, and by entering upon controversial and doubtful details of secondary consideration to obscure the value of the greater principles—such it seems has been the effect of the perishable lava theory upon the "Retired Gold-digger," for he apparently finds some subordinate part of the theory objectionable, yet at the same time he adopts the groundwork, and brings a valuable addition to it.

His clear language is unmistakable when he writes:—"I am of opinion that quartz, in a liquefied state by igneous action, has been the principal medium of conveying gold from a great depth to the surface of the earth;" and this opinion is the first position of the theory he professes not to value. Until lately no one dared thus to beard the alleged scientific deductions, and to speak so boldly of liquefied quartz being the medium of conveyance. Formerly the debatable question among the learned was chiefly whether gold in quartz-veins was due to electro-magnetism, or to sublimation from ascending mineral vapours. The writer of the perishable lava theory, almost alone, fairly asserted that gold was conveyed from the earth's interior in a liquid which included quartz, and that the same quartz, when not retained in the fissure of egress, separated itself after emission in liquid globules, as oil will do in water, and then becoming solidified, is now one of the substances which has not perished; even the "Retired Digger" does not go so far as to say that liquid quartz has been the only medium of conveyance.

In dismissing the theories of aqueous abrasion and atmospheric influences so summarily, the "Retired Gold-digger" is too flattering—vanity whispers that my late letters on these subjects have influenced that rejection—let it not be forgotten that those theories have been sanctioned by some of the greatest intellectual luminaries of the age; the 'Lectures on Gold' is the joint production of Professors Jukes, Forbes, Playfair, Smith, Percy, and Mr Hunt; and these professors, with Sir Roderick Murchison and many other scientific individuals, have entertained those theories almost without a scintilla of doubt. The lions are now sick, but let us not give them the ass's kick.

That gold has been conveyed to the earth's surface in liquefied quartz the "Retired Digger" admits, but I have also affirmed that the liquid matter has been horizontally distributed, and that the gold globules necessarily fell to the bottom when in a surface-spread liquid, and the universality of flat gold in slates is good evidence of the metal being also, at the same time, in a liquid state. The "Retired Digger" has studiously avoided touching that part of the subject, which is in truth the main point, the great fact and principle which led to the alluvial gold discoveries in Australia, and which no scientific writer has yet appreciated in considering the origin of the noble metal in alluvia. The "Retired Digger," however, in granting the premises has made a probable overflow apparent; and if an overflow has in any case ever taken place, then the great preponderance of gold in alluvia over that in veinstones all over the world, leaves but little doubt that the greater bulk of alluvial gold has originated in an overflowing auriferous liquid. The admissions of the "Retired Digger" show that there is a physical necessity for one and a high probability of both the following positions, namely, either that the liquid quartz and gold overflowed the channels that conveyed it from the earth's interior, and consequently spread horizontally, or else that a volume of some matter other than molten quartz and gold was emitted from the same openings. Both these are leading principles in the perishable lava theory.

If the "Retired Digger" believes that liquid quartz and gold ever overflowed its channels of conveyance from the earth's interior, it is then self-evident that gold in the metallic state would sink to the bottom in a surface-spread liquid, and if after the solidification the quartz were shattered to fragments by the means which he has indicated, then a novel idea is expressed as far only as regards the origin of quartz-fragments; we should perfectly agree in one great principle respecting the origin of gold, namely, that it was derived from a highly heated horizontally distributed auriferous liquid—and that is a great fact, to all appearance, which no scientific writer has yet ventured to avow.

If, on the other hand, the "Retired Digger" imagines that the auriferous quartz (when shattered into fragments by the agency he has suggested, which also released the metal from its stony envelope, and thus originated all alluvial gold), had lately been a liquid strictly confined to veins, and had never emanated from them in the liquid state—let us try to imagine the process of formation whilst the quartz was yet in a liquid state, and the fissures, though brimful, yet were not overflowing; is it conceivable that metallic gold, a substance seven times heavier than the liquid containing it, could float on the top or in suspension? It is manifestly impossible; a moment's tranquillity when quartz was in the liquid state would have been sufficient time to allow of its descent; and yet quartz-veins are notoriously richer at the top. The most violent ebullition could not sustain metallic gold at the top in liquid quartz, and to suppose ebullition is strong presumption of a possible overflow; the metallic gold must have been suspended by some power, and what could that power possibly have been other than the force of emission, without which gold, in the metallic state, could no more swim in liquid quartz than it can in free water. To admit an emitting force argues that some matter was emitted, and that matter must have been either an auriferous liquid quartz in the act of being horizontally distributed, or it must have been other matter which, for convenience, is collectively termed a perishable lava.

But when it is admitted that there was an emission of liquid matter, which is also strongly confirmed by the flattened gold in slates, and when it is assumed that gold and quartz were separated from other matter, and that gold especially separated itself only near the surface after release from pressure,—considered also with the fact that the two substances possess different congealing points,—then every difficulty is removed. To repeat words which I have used before, the fissures which are now auriferous quartz-veins would be filled with gold and quartz, when the emitting force began to grow gradually feebler, when the auriferous solvent near the vent of emission was undergoing separations, and while the emitting force yet prevented the arrangement in the vein of the separated ingredients in the same order of their specific gravities as occurred in the surface-spread solvent, then the fissure would be filled by that product possessing the highest congealing point solidifying against each lateral wall, and the separated ingredient most likely to be entangled and encased in the solidified matter would be that possessing the greatest specific gravity, which would be mechanically suspended in the vein as the emitting force diminished. Gold has the greatest specific gravity—quartz has the highest congealing point and fills the veins; hence gold in apparent former fusion in a quartz matrix.

With respect to the particular mode of disintegration so well described by the "Retired Digger," it appears to be both possible and probable, and is a valuable suggestion to account for the way in which quartz fragments have originated in some localities, and the manner in which the tops of some quartz-veins have been destroyed, but it is not of that comprehensive character to be termed another theory; it is in no way antagonistic to my theory, but as far as it goes is an admissible part of it. It may be remembered that whilst fragmentary quartz at Bendigo is abundant on the flats, the great body of the drift forming the Seven White Hills is composed of perfectly rounded pebbles, almost exclusively quartz, and almost without an angular fragment; thus both our views may be true of the same gold-field. It is an objection to the universality of the release of gold from quartz by the means indicated, that cold water must have appeared in all cases just in the nick of time, when the quartz was at a proper heat,—the inference may be true of some localities, but it is unlikely to be true of all. Circumstances hurried my theory somewhat prematurely to publication in a manner unfitted for critical perusal, which may lead some persons to say, like the "Retired Gold-digger," that they attach little importance to the theory, yet at the same time acquiesce in its most important principles, which at the time of their first appearance were widely at variance with the current scientific and popular opinions upon the subject. But now every digger I speak with confesses that he always entertained such opinions in secret, although overawed and silenced by scientific authority into a reluctant acknowledgment that all alluvial gold resulted from the natural grinding down and gradual decay of petrified quartz-veins.

I am, Sir, &c., SIMPSON DAVISON.

These letters had not, however, the effect of drawing forth any opinion avowedly from the Rev. Mr Clarke either affirmative or negative of my views, but the apologetic tone and great ability evident in the following public letter confirmed my supposition of his being my anonymous adversary. "The Retired Gold-digger" thus wrote again on THE ORIGIN OF GOLD:

SIR,—I am obliged to Mr Davison for the friendly spirit he has evinced in his reply to my observations respecting the origin and deposit of gold, contained in last Monday's 'Empire,' and will now, with your permission, address a few words in reply in the same feeling.

Mr Davison writes: "In dismissing the theories of aqueous abrasion and atmospheric influences so summarily, the 'Retired Gold-digger' is too flattering—vanity whispers that my late letters on the subject have influenced that rejection," &c. I beg to assure Mr Davison that the opinions contained in my letter were entertained by me soon after my arrival on Bendigo, and before I read his first letter, which was addressed to Mr Hargraves. With the style and spirit of that letter I was much pleased, for the writer delivered his opinions with an earnestness that marked his sincerity, and a modesty which commanded my respect. Many subordinate parts of his theory were ingeniously conceived, and very probable; but, if my memory is correct, I understood him to intimate it as his opinion that gold had been brought to the surface more intimately associated with a lava of a perishable nature, which had since disappeared, than with quartz or any other substance. This seemed to me to be the leading point of Mr Davison's theory, and, while considering it not impossible, I could not find sufficient evidence in his arguments to lead to the belief that a perishable lava had accompanied the gold at the period of emission; while, on the other hand, the fusible nature of quartz, and its more intimate association with gold than that possessed by any other substance, seemed to point it out as a sufficiently perfect vehicle for the conveyance of gold to the surface of the earth. In Mr Davison's reply to my letter, he seems to intimate that what I lately deemed the leading principle of his theory is but a secondary one, and I am glad to find it so; for I had thought (probably through misinterpretation of his meaning in the first letter) he attached more importance to the agency of a perishable lava than he does.

Mr Davison says: "The writer of the perishable lava theory, almost alone, fairly asserted that gold was conveyed from the earth's interior in a liquid which included fluid quartz; and the same quartz solidified is one of the substances that had not perished; even the 'Retired Digger' does not go so far as to say liquid quartz was the only medium of conveyance." I am glad to find Mr Davison's ideas in many respects so closely resembling my own; and I will candidly acknowledge that I do not think liquid quartz in the mass was the only medium of conveyance. However, I would hesitate long, with our present means of information, before I could imagine that a medium must necessarily be of a perishable nature. On the banks of Lewis Ponds' Creek, a few miles above Ophir, there are many places which exhibit traces of powerful igneous action. Quartz-veins and quartz-fragments are present, but not of size or in quantities sufficient to indicate the presence of much gold, except we suppose the igneous action had also a share in conveying to the surface a considerable portion of the gold found there. Similar points above flood mark abound at many of the diggings in New South Wales. Is it not possible that immense bodies of quartz may exist deep in the interior of the earth in the vicinity of such places;

that at the time of the production and emission of gold the upheaving force had been too weak to develope them at the surface, but had thrown up through fissures small streams of liquid quartz highly auriferous? The formation at the places above noticed is principally composed of a hard talcose schist. I think quartz-veins in a clay slate formation are generally more numerous, better developed, and more continuous than those in a hard blue slate formation. Is it not possible that the softer and more yielding nature of a clay slate formation offered less resistance to the bold development of quartz-veins by upheaving power? Is it not possible that large masses of gold in a state of fusion may have been detached from liquid quartz deep in the interior of the earth by disrupting agencies, and conveyed to the surface in company with trap-rock? The peculiar appearance of a rich surface hill on Tipperary Gully, and a somewhat similar one on New Chum Gully, Bendigo, first caused this idea to cross my mind, for quartz-fragments are scarce in both places. That a small quantity of gold is separated from the quartz by aqueous abrasion is highly probable, and that atmospheric influences have some effect, seems equally so. I deem it probable there are others also, each contributing a little assistance to the great process of separation; but I would earnestly recommend to the attention of scientific men the subject of disintegration by explosion, as probably the most powerful agent of all in the mighty work.

I assure Mr Davison I did not purposely avoid touching upon a point which he justly deems of importance—the overflow of quartz in a liquid state, and its horizontal distribution, while the gold, from its greater density, insinuated itself between the slates, and there remained. Nature speaks very plainly on this subject at the various diggings. I think it very likely as an important secondary cause. In Oaky Creek, an important tributary of the Lower Turon, leading from the Bald Hill to the river, there is a remarkable instance of a small quartz-vein horizontally appearing on the bank of the creek, which, from its relative position to an enormous vertical quartz-vein a few yards distant, seems to have conveyed a large portion of the auriferous treasures of the latter to the creek. The rocks below it are covered in some places with a thin coating of quartz until within flood mark. About twenty yards below the large vein seems to have been cut across and shattered into fragments, which are deposited lower down the creek. I quite agree with Mr Davison in the opinion that gold has been derived from a highly heated auriferous fluid, but I think, upon mature reflection, he will not deem it to have been universally distributed in a horizontal manner.

In the few remarks published in last Monday's 'Empire' I had no intention of attempting to found a perfect theory, but, possessing ideas which I deemed might add a drop to the great ocean of truth, I thought it advisable to lay them, disjointed as they were, before the public.

The Seven White Hills at Bendigo present an interesting subject of study for the geologist. With the exception of the Eagle Hawk White Hills, but which are much smaller, I believe they are the only drift hills on Bendigo. Geologists seem at a loss to conceive any adequate idea of the causes which produced such remarkable exceptions to all the other hills on Bendigo. Bendigo Flat is a large basin, draining a very extensive tract of country. Immense floods, of which we possess but an imperfect idea, have probably in remote times rushed with fearful impetuosity down Bendigo Flat, receiving foaming rivers from the numerous gullies in their course. Ironbark and Long Gullies take a sharp turn and enter Bendigo Flat opposite the Seven White Hills. Is it not possible that the water from those gullies, striking the main body in Bendigo Flat nearly at right angles, would push the immense mass of debris there in motion to the opposite side of the flat, where the White Hills now stand—in fact, in every successive flood, adding to their size, until they attained the appearance they presented four years ago? But I may be asked, why are they composed of rounded quartz pebbles alone. The first, second, and third White Hills are pretty much so, with a substance of a sandy appearance, which seems to answer the purposes of a cement, intervening between the pebbles. But a change is manifest after passing to the third hill, for the fourth, fifth, sixth, and seventh gradually alter in appearance, till at the end of the seventh, at what is termed the Epsom diggings, quartz pebbles are comparatively few in number, and alluvial soil and decomposed slate and trap-rock bear by far the greatest preponderance. The pebbles are hard, and have every appearance of having been rounded by the action of water. The gold is scaly, and has the appearance of drift gold. Opposite the seventh White Hill the flat is narrower than above, and, judging from its present aspect, appears to have been at one time too narrow to convey away quickly the enormous volume of water necessary to carry along and deposit such colossal quantities of drift as the White Hills seem composed of. Such a check as I have imagined would facilitate the deposit of the debris. The small White Hills near the lower part of Eagle Hawk appear to bear the same relative proportion in size to it as the Seven White Hills do to Bendigo Flat. Some object that the quartz is very different from all other quartz on Bendigo. Certainly it is *now* much harder, but I doubt if it was always so. It is a well-known axiom that if a stone remains in a stream sufficiently long to be rounded in form, it improves also greatly in hardness. The powerful attrition necessary to round every piece of quartz would suffice to crush the clay slate and trap-rock of Bendigo to powder—the quartz being much heavier would probably first settle, and the crushed and decomposed debris would travel further on to the lower White Hills and the Epsom diggings. At the Epsom diggings I saw holes sixty feet deep, out of which there were comparatively few pebbles. My ideas respecting the probable causes of the formation of the Bendigo White Hills are purely speculative, but, as I have never heard any person venture a hint upon the subject, I shall feel amply rewarded if any one who has studied the matter will oblige the public with the fruits of his observations.

In conclusion, I thank Mr Davison for his interesting communications on a difficult subject, and am happy to find our opinions coincide upon many points. Mr Davison possesses the merit of having awakened public attention to a very important object of study at the present time. I remain, Sir, &c.,

Sydney, Feb. 19. A RETIRED GOLD-DIGGER.

The local press had usually maintained a perfect silence, and neither discussed nor commented upon the theory which I had advanced as being entirely original, and calculated to meet the facts in nature; there were, nevertheless, some instances in which the radical principles of it were surreptitiously adopted by the journals, without any acknowledgment. A dishonest plagiarism of this kind is in substance the italicised sentence of the following extract from a 'Melbourne Herald,' dated in 1856:

ORIGIN OF GOLD.—The following is the generally received theory as to the origin of gold and other metals: The whole surface of crust of the earth is in a condition of crystallisation, proving that previous to its present solidity it must have been in a free or liquid state. It was at this liquid and gaseous period that all the substances, from the most dense to the lightest, arranged themselves in vast parallel layers or strata, according to their specific gravities. When the cooling process had sufficiently advanced, the hard crust was broken up by the shrinking or contraction of the interior; mountains were formed, and all the irregularities of violent disruption took place. Coeval with this shrinking, fissures or huge cracks were made; from this source alone have metals been brought to the surface. The amount of the precious, or any of the metals, is most insignificant to the vast beds which exist in the interior. *In some places the liquid quartz, containing the gold, ran over the mountain sides.* From the disintegration or decomposition of this quartz, by the action of water and the atmosphere, the gold has been liberated, forming our surface mines or gold-fields. The uncertainty connected with quartz-mining arises from the vein or fissure not being of uniform depth, only those portions which have extended to the great gold strata containing the metal.

Part Fifth.

CONFIRMATIONS OF THEORY.

THE anonymous letter which closes the Fourth Part of this volume, although in its tenor so satisfactory with respect to the leading principles of my theory, yet wanted the stamp of avowed approbation from any one or more scientific authorities upon whose opinions I could place any value; but while I felt little doubt of its having come from the pen of the Rev. Mr Clarke, and that it sincerely represented his own private opinions, the following Review, which I believed to have proceeded from the same writer, wherein the Reviewer criticises with apparent hostility what I suppose to be his own anonymous 'Few Words on the Origin of Gold,' again opened the discussion—the Review, however, appeared in print about the date of my SEVENTH PUBLIC LETTER, that is to say, just before the friendly explanations in the last communication of the "Retired Gold-digger."

THE GOLD MINES OF VIRGINIA, GEORGIA, CAROLINA, AND OTHER OF THE UNITED STATES OF AMERICA.

REVIEW (*From the* 'Herald,' *22nd Feb.* 1855).

SCENERY, SCIENCE, AND ART; *being Extracts from the Note-book of a Geologist and Mining Engineer.* By Professor D. T. Ansted, M.A., F.R.S.

The character assigned to this volume in some of the English reviews is not overrated. It is a plain, unpretending, instructive work, by an intelligent, highly educated, and accomplished man of science, gifted with peculiar powers of observation, and skilled to understand thoroughly what comes in his way. In fact, it is the result of the meditative moods of a traveller, who, having well weighed what he has seen and heard, gives the result of his conclusions for the benefit of his readers, without presumption or exaggeration. The scenes described lie in many lands—France, Switzerland, Germany, Spain, Sardinia, Algiers, and the United States ; each furnish their quota of information to our traveller, who passes from one to the other in the order enumerated.

Mr Ansted being a practical geologist and mining surveyor, and the objects of his travel having been connected with his professional pursuits, much of the volume partakes' of the nature of his studies ; and the scenery and art alluded to in his title-page are mere handmaids to his science. He does not, however, bore his readers with dry technicalities, nor does he intrude upon them with useless discussions on points in which they may have but little interest. In fact, it is to be rather wondered at that he has not said more upon some of these topics.

Our object in venturing to introduce the book a second time to our readers is not to review it again, but to bring before the Australian public the author's views relating to the manner in which gold has been found in certain rocks. At this time there seems to be a fever raging on the subject with a certain class of persons, the least capable, perhaps, of coming to any safe conclusion upon it, simply because they are, by want of previous instruction, unable to appreciate the facts which they profess to have witnessed. It has been said that miners, meaning the mere practical miners, whose hands are skilled to use mechanical contrivances, but whose brains are not the best stocked in the world, are the worst judges that could be produced of the phenomena which they come upon in their subterranean researches ; and it may be questioned whether the amateur scribblers who indulge in long diatribes about quartz-veins and nuggets really know what they are writing about. For, before such persons can have any right to speculate as to how gold can have been combined with quartz, it is not sufficient to know whether gold could have been melted, but they ought to be able to explain how quartz could be melted also in the veins in which the gold is occasionally found. It is but a few days since a gold-digger was found declaring, with all the confidence of a Davy or a Turner, that quartz was a much more easily melted subtance than limestone or slate, not knowing that by heat alone the reduction of quartz is one of the most difficult things in nature ; and another author, whose views have been gained through a pin-hole in one side of Nature's temple, was some time ago denying a fact put on record by a host of scientific observers, that gold is not always found in quartz, as in regular veins, but is also disseminated in the body of various rocks of different formations.

Now, on a question of this kind the opinion of such a man as Professor Ansted ought to have great weight, especially as he is in no way concerned with any local views, or engaged in the defence of or opposition to any hasty generalisations of self-sufficient persons. We hope therefore, in bringing his opinions thus prominently forward, we shall be serving the cause of truth, and giving to some who need it an idea that all things are not necessarily framed according to their own express arrangement with Nature.

In the third chapter of the section on America he gives some interesting particulars of the Virginia gold-fields, from which a few useful hints may be taken.

The rocks he describes on James River, which is parallel with the Blue Ridge of the Appalachian chain, consist of schistose and quartzy beds, resting on gneissic and granitic rocks, the decomposition of which produces a rich, highly ferruginous soil. "No doubt," says the author, "there exist in the gneiss considerable veins of oxide of iron, and it is probable that the gold found in the district, and at present extensively mined, has been obtained from these irony, and perhaps quartzy veins in granitic rock. . . . . . I saw abundant evidence on the road-side that not only had the streams and river-beds been washed for gold, but that a large quantity of white quartz-rock had been crushed. The fields and roads abound with large quartz-fragments resembling boulders, and the ground is everywhere of the brightest vermillion red.

"On the Waller estate I found the country consists of a very hard, tough, hornblendic schist. Between this rock and a fine granite, or rather syenite, which comes out abundantly at some distance, there appears to be a broken and varied series of quartz-veins and soft broken schists, often highly micaceous and everywhere deeply impregnated with peroxide of iron. These sometimes alternate with veins of highly pyritous grit, arranged in bands nearly vertical, which are parallel on the whole to the strike of the hard hornblendic schists, and are also parallel, or nearly so, to one another. Of these there are on the property three distinct groups of bands and veins, all auriferous, and very rich in gold in certain places. Washings were formerly carried on successfully in a small gulley running through the estate, and on searching for the veins whence the auriferous sands had been removed, they were found distinctly marked close to the surface.

"The first vein seen in ascending from the brook is known as the Waller vein. It has been much and profitably worked to a depth of about thirty-five feet, when the necessity of pumping stopped operations. The surface has been worked to some distance near where the shaft was sunk. At a very short distance beyond, the Goochland vein is shown by an open cutting, and is found to be a hard quartz lode cutting the Waller vein near the shaft where the largest quantity of gold was found. Still further up, towards the north-west, another powerful quartz lode shows itself at the surface, but has not been opened.

"An auriferous vein has been found in the rocks that occur south-east of the Waller property; but this is the last in this direction, as at present known; and there is also one, and one only hitherto determined, to the north-west, connected with the rocks of this district. Some few miles further west other lodes are known, but they have been little worked in Fluvanna county. Other veins at Tolersville to the north seem to be in rather different condition.

"The general character of the so-called veins in this part of the country is that of irregular quartzy bands, varying in thickness from half an inch to several feet, enclosed in a highly ferruginous rotten schist, often having large plates of mica extremely rotten, and passing into a kind of marly sandstone of loose texture. Where the rock is of average quality, as it is considered to be in the best veins, the work may be carried on with the certainty of finding gold throughout great thickness of mineral; but in other cases the expenses of working are apt to swallow up all the profits, however large they may be, that arise from occasional rich portions, whether in shoots or nests.

"I am inclined to believe, from what I have seen in this part of the mining district, that the whole of the so-called quartz and other veins are really nothing more than nearly parallel bands occupying a definite position, forming part of the great series of altered rocks on the eastern side of the great axis of the Appalachian chain, and dipping at a high angle away from that chain, throughout the whole country, from the State of Maryland to the final dying away of the axis in Georgia. To say that there are large alternating bands of hornblendic rock, quartz, and schists, describes this series in a general way. Lumps of gold weighing twenty ounces have been found, and from single nests gold to the value of from 500*l.* to 2,000*l.* has frequently been extracted. Where, however, these richer portions are found, the average of the rock or vein is generally not increased, and perhaps the most favourable conjuncture is where several bands or veins usually bearing gold come near together, so that two, three, or more of them can be worked without inconvenience from a single shaft. The gold is either disseminated through very frangible quartz, spread in spangles on more hyaline and harder quartz, deposited in narrow crevices in soft blackish or red irony sandstone, disseminated in grains and small pepites in soft and micaceous irony sand, or spread undistinguishably through a mixed mass of sand, blue slate, pale yellow slate or schist, and hyaline quartz."

Here the doctrine of *disseminated* gold is maintained in its integrity. There can be no dispute about the author's meaning. Again, in the following extract, we have additional evidence :

"Returning to Columbia, and thence proceeding up the canal to New Canton, a distance of nine miles, I found, after passing the syenite and a considerable tract of schists, a distinct repetition of the auriferous rocks, comprising highly ferruginous sands, soft rotten schists, bands of quartz, sometimes more than a foot thick, garnet schists, both pale and high coloured, and other rocks that appear to accompany gold. On inquiry, I found that gold had really been obtained in this neighbourhood to some extent, although it is not now worked. There was hardly any noticeable difference in the condition of the rocks here and near Columbia, and on examining the dip it seemed that this was reversed, so that, although at first sight it appeared as if there were two auriferous belts, I am inclined to think that these two may have originally formed portions of one, which has been broken, and partly washed away, on the thrusting up (though to low elevation) of the hard syenitic rock now between them.

"Proceeding from New Canton to the mines called Buckingham, and thence to the Booker, or Garnett and Mosely mines, the road, running south-west, or nearly so, remains almost constantly on the crop of the great western auriferous band. The first mines are those called Buckingham mines, and those of Mr Eldridge. The ore in both cases is an auriferous pyrites, occurring in a whitish or white schist. The vein is worked at a depth of 90 feet or thereabouts, but has been proved to 160, and remains uniform. It yields about 6 dwts. of gold to the ton, and some silver. Of this there seems an indefinite quantity ; and from the Buckingham mine there were obtained about 1,500 ounces of gold in the course of last year. The expense of getting and reducing is estimated at 15s. per ton, but there is much loss. About twenty tons of ore per day are crushed and amalgamated on an average, the daily yield lately being 130 dwts. . . . .

"The conditions under which the gold is found in the Garnett and Mosely mines are in the highest degree interesting and instructive

The surface here shows a belt more ferruginous than the rest of the country around, ranging north-north-east and south-south-west, and dipping west. The actual breadth of this belt I had no means of exactly ascertaining, but it certainly exceeds 200 yards, and is probably much greater. It is, however, subdivided, including distinct bands of mixed quartzy threads and rotten red and yellow or greenish schists. On these repose bands of talcose or chloritic schist, which pass into an imperfect steatite, occasionally used as a firestone to line furnacés. All these are on the east or lower side of the series. In the middle, between the two well-marked auriferous bands which next succeed, is a certain thickness of hornblendic greenstone, hard, and tolerably compact. The eastern auriferous band has been extensively worked at the surface, and recently has been sunk upon to such a depth that the character of the rock and the circumstances of its auriferous contents are well known. In this schist, at a small depth, are a multitude of quartz threads, and farther down these threads come together, forming a distinct quartz band, often enclosing portions of the schist. The gold disseminated indifferently near the surface, amongst the quartz, rotten schists, and enclosing walls, gradually collects together into threads, usually ranging with the schistose portions within the quartz band. The walls are very distinctly marked, and easily separated, and are found to be no longer auriferous, while the quartz, of which the thickness amounts to 10 feet at a depth of about 100 feet from the surface, seems to increase continually in value."

The geological view is thus summed up:

"The facts established with regard to the auriferous accumulations in this and others of the gold mines of Virginia have a bearing not only on the practice of gold-mining, but also on the general theory of metallic deposits. For the practice of gold-mining in any systematic way, it is clearly important that the geology of the subject should be known, for there is hardly any department of mining in which the usual mode of estimating value, finding the yield of a sample by panning or assay, is more deceptive,—as indicators of gold, sulphuret of iron, and quartz, have been long known to possess singular value. Two or three kinds of slate or talcose schist, and a peculiar form of chlorite, are also found to be favourable generally. Here also, as elsewhere, garnets are remarkably constant; and some other conditions, such as the vicinity of chloritic and hornblendic rocks, and a peculiar state of the quartz, are worthy of notice. With regard to the theory of metalliferous deposits, the results are, I think, not less important. We have here one of the most extensive gold regions at present known, reaching from Georgia into Canada, and including, in the part that I have examined, two belts of auriferous rocks separated by syenite. The gold occurs in the rock beyond all question; and although occasionally to be obtained from placers or diggings, where it has been transported by water, this is an exception to the usual condition in this part of the country. The rock within twenty or thirty feet of the surface is in a state singularly different from that presented at the depth of forty feet and more, and this difference does not admit of being explained by any ordinary or extraordinary kind of decomposition. The enclosing slates and schists are indeed rotten and disintegrated, the quartz broken and weathered, the iron highly oxidized, and the whole band or vein readily reduced to mud. This, too, is especially the case within a small depth from the surface. But decomposition will hardly account for a change in thick, well-defined quartz bands, to small but distinct threads, from an inch or two to a foot thick, perfectly detached from each other, and imbedded in innumerable thin flakes of coloured schists. It is another point of importance, that the appearance presented by the quartz, when forming veins sufficiently well marked to pass current on a cursory observation, is not the condition found to prevail generally, when the whole system of rocks is examined."

It is very certain, that whatever opinions may be entertained by Australian gold-diggers as to the improbability of gold having been diffused, occasionally, through the body of certain rocks, Mr Ansted does not take part in those opinions; his statements are clear enough as to the fact, that in Eastern Virginia at least, gold is diffused not only in quartz but in other rocks, and in this he agrees with numerous other authors in Europe and America.

We must beg the reader not to conclude that, because we have confined our extracts to one particular subject, therefore the other parts of this volume are not equally worthy of notice. It would, we may remark, be difficult to choose where all appears equally deserving of notice, but having a particular object in view, we have limited our reproduction of the author's sentiments to that object, one respecting which it may be useful to encourage the extension of inquiry in certain quarters.

Another letter which appeared at this time seemed indirectly to comment on the questions at issue; it was addressed to the Editor of the 'Empire,' and headed THE FORMATION AND DEPOSIT OF GOLD.

SIR,—In your issue of this morning, I observed a paragraph in reference to the gold-fields of Fingal, in Van Diemen's Land, wherein it is stated that, amongst other explorations in that vicinity, shafts are being sunk through *slate and quartz*, to a considerable depth, and that it is confidently predicted large quantities of the precious metal will be discovered at a distance of one hundred feet from the surface—(or, more or less, I presume).

Now, Sir, the language which the writer has here employed, although of a nature *general enough* to those who are inexperienced, to others who have studied and practically weighed the subject, simply indicates the presence of the primary schistose formations; but whether those formations be amalgamated with the quartz in detached nodules or dykes, is left partly to conjecture; considering, however, the very few instances of the existence of this former combination (that is, *in force*), I take it for granted that the sinkings penetrate the *solid* transmuted rock upon or near to a *vein* or *veins* of auriferous quartz. Moreover, the reporter cannot mean, by the language he employs, that the "slate and quartz" consist of the *debris* contributed by adjacent strata, because in no case, within a gold-bearing area, do such large masses of only two simple materials exist in that form; were such indeed the case in the present instance, or did I for a moment suspect such to come within the interpretation of the passage, I should be wasting your time in calling your attention to the following brief statements.

In none of my observations (and they have been somewhat extensive) either throughout the Sierra Nevada, Victoria, or New South Wales, have I ever discovered one instance of gold *in situ* at any depth, in any of the metamorphic rocks; it is true that where there is excessive cleavage, or where comparatively deep and extended fractures have resulted from ancient elemental action, the particles of drift gold reposing near and upon the surface of such epochs have been precipitated within, and thence, through their superior density, have ultimately become wedged and consolidated with the overlying and lateral portions of the embedding strata; but those particles—whether highly comminated or otherwise—have very seldom reached a greater depth than three or four feet, and to the most careless observer appear altogether of mechanical deposition.

I am fully aware of the many conflicting opinions on this subject, and however I may be disposed to respect some of them, I cannot give up my own, based as it is upon the practical researches of five years, through every phase of gold-mining, and in three distinct gold regions.

Holding this argument, then, I regret to believe that so much misapprehension prevails in any quarter as to induce men to throw away their time and money in searching for what (in this case) will assuredly prove a myth. It is not an impossibility that gold products—the elaborations of a time, millions of years perhaps antecedent to that of man's creation—lay for ever concealed beneath portions of the transformed aqueous sediments, where those sediments upheaved from the ocean have assumed compact and indurated shapes; but as those sedimentary bodies extend from seven thousand to upwards of twenty thousand feet in thickness, it must be allowed that this is rather a formidable bar to the progress of the most ambitious explorer!

It was from a want of knowledge of these few plain facts that so many parties with the most sanguine hopes, eighteen months ago commenced the futile and expensive task of searching after "second bottoms" in the top crust of the Bendigo rock (a white and yellow semicalcareous schist, as soft as, and resembling, pipe-clay, and interstratified with hard bands of sand and clay slate). As I stated before, and at the time, so did this absurd speculation result;—it was a complete failure, the delusion being confirmed (where great depths were reached) by the gradual approach of materials much harder and more difficult of removal, although of course still homogeneous. Below the first superficial fractures and breaches (which led to the whole mistake) no auriferous deposits ever were, or will be, found.

In conclusion, Sir, although I cannot say that during the last few years I have been altogether idle, even in a literary point of view, in my endeavour to elucidate the nature of gold deposits, I yet do not on the present occasion court controversy; although I shall, with pleasure, reply to any objection that may be publicly taken to any of my preceding observations: my only motive in addressing you this letter is, if possible, to do a little good, by warning others of this fact—trite and old-fashioned though it be—how simple a matter it is "to throw good money after bad." I am, Sir, &c.,

Sydney, March 22nd, 1855. R. Croudace Joplin.

The Reviewer's observations and these other indirect remarks led me to notice Professor Ansted's opinions on gold in the 'Empire' as follows, in an EIGHTH PUBLIC LETTER:

Sir,—I am desirous of offering a few remarks upon Professor Ansted's opinions respecting gold deposits, as reviewed in the 'Herald' on the 22nd ultimo, the review apparently having reference to some correspondence which appeared in your columns about the same time.

Professor Ansted, whose high scientific attainments and practical mining knowledge entitle his observations to careful consideration, visited the gold districts in Virginia with especial reference to mining in gold veins (being himself the president of a company which purchased the patent of Berdan's auriferous quartz-crushing machines), and he has consequently neglected to bestow particular notice upon gold in alluvia; while the learned professor, in attempting to explain his meaning in a pleasing and popular manner, has neither written with the accuracy to be expected from a scientific writer, nor expressed himself in terms familiar and intelligible to practical gold-diggers; there is throughout his "Notes" a great want of discrimination between gold as found disseminated through veinstones, mixed amongst auriferous drift, and scattered in the debris of rocks decomposed in position.

The auriferous veins in Virginia, it seems, are not developed at the surface in broad linear masses of compact quartz as they mostly are in Australia and California, but appear there in a complicated system of threads collecting downwards into larger quartz bands, or, as it might be otherwise described, spreading out upwards into threads from larger quartz-veins at a small depth from the earth's surface, the whole being contained in a formation of schistose and granitic rocks; to quote the exact words—"In this schist, at a small depth, are a multitude of quartz threads, and further down these threads come together forming *a distinct quartz band*, often enclosing portions of the schist,—the gold, disseminated indifferently *near the surface* amongst the quartz, rotten schists, and enclosing walls, gradually collects together in threads, usually ranging with the schistose portions *within the quartz bands*,—the walls are very distinctly marked and easily separated, and are found to be *no longer auriferous*." The reviewer pretends to believe that that is the doctrine of dissemination maintained in its integrity! It is cheering information for the veinstone gold-mining adventurers in Australia to see the passage conclude with the positive affirmation, that in Virginia "the quartz bands, of which the thickness amounts to ten feet at a depth of about a hundred feet from the surface, seem to increase continually in value."

We find the professor afterwards stating that "the gold occurs in the rock beyond all question," but in what rock? Why in the veinstone,—in the quartz bands or veins enclosed in walls that are no longer auriferous. The dissemination of gold through quartzy and irony veinstones is a fact which no one ever doubted, but that is a very different affair from an equal dissemination of gold through the whole body of massive granites, schists, &c.

The reviewer assures us that the professor is skilled to understand thoroughly whatever comes in his way, but beyond expressing his inclination to a vague and doubtful belief (which further observation will correct) that the so-called quartz and other veins are in reality nothing more than nearly parallel bands forming part of a great series of transmuted rocks, the awfully intelligent author of the 'Notes' has not otherwise favoured us with any opinion concerning the original formation of the so-called quartz bands, therefore I will not at present intrude any humble explanation of those particular veins or bands when an omniscient professor hesitates to do so after an examination on the spot. I may excuse my presumption for ever having done so in other cases with the apology of Hugh Miller, who said that he became a geologist because he could not help it,—the usually hidden wonders of nature forced themselves upon his notice; and so did the phenomena of the alluvial gold deposits constrain me to consider their origin and connection with auriferous quartz-veins.

A 'Retired Gold-digger' (obviously guided by no mean scientific hand) recently, when pressed for an opinion in reply to my repeated assertions that molten gold had been horizontally distributed and the liquid metal insinuated in drops between slates, not only admitted that such was the fact, but he added that "Nature speaks very plainly on the subject at the various diggings." Now, if nature speaks so very plainly on the subject, how does it happen that Professor Ansted, who thoroughly understands everything, is entirely silent on the subject as late as 1854? Since first noticing the unexpected physical fact at Wood's Creek in 1849, subsequent experience has been confirmatory of its universality, and yet for some time past I have called attention to its importance, and found no writer, scientific or otherwise, willing openly to second the bare fact, much less to draw a conclusion from its consideration (Mr Hargraves excepted, who anticipated making some sensation in England by his approbation of it), until at last a plain speaking gold-digger, writing anonymously, says in effect (though otherwise highly complimentary to me) after a manner that reminds one of the old tale of Columbus and the egg again,—"of course it is so—that is nothing new —it needs no *savant* to tell us that obvious truth—nature speaks very plainly on this subject at the various diggings." Simple as is the truth, and plainly as nature speaks, the fact in question has been hitherto unknown or discredited amongst men of science, Professor Ansted included, though its reception is fraught with vast scientific consequences, the extent of which it is possible that the retired digger has not yet fully appreciated. Let but scientific reasoners receive that truth with confidence, and it immediately becomes the pivot on which all future speculations will turn—the fulcrum for moving a new world of enquiries.

And another gold-digger, a Mr Joplin, fully corroborates what I have before affirmed respecting the absence of gold in dissemination through the mass in schistose rocks, since he had never, throughout a long gold-digging experience upon the gold-fields of California and Australia, in any one instance discovered the metal *in situ* in any of the metamorphic rocks, but the particles of drift gold which he found invariably reposed in the fractures upon the surface of these strata, and always appeared to the most careless observer "to be altogether of mechanical deposition;" meaning thereby, I presume, that just as to the most careless observer of the motions of the heavenly bodies the sun appears to revolve around the earth, since the most untaught peasant can see the apparent fact every day with his own eyes, while a little reflection shows the inquirer to the contrary, that it is the earth which revolves around the sun; and still further research convinces the most sceptical student that the Copernican system, as a whole, must indisputably be true; so it is, he would imply, with the gold deposits. To the most careless observer the gold deposits appear to be altogether of mechanical deposition; a little reflection and more careful observation leads to the belief in their igneous origin; but more mature study convinces the inquirer that both igneous and aqueous agency are together insufficient to account for all the phenomena of the gold deposits without calling in the aid of various other forces comprehended in the general terms of *chemistry* and *natural philosophy*. Mr Joplin is not a careless observer, at least he is far in advance of those professors, if any such there be, who would continue in the present state of enlightenment to insist upon "the doctrine of dissemination in all its integrity."

"Though gold is occasionally to be obtained from placers or diggings," says Professor Ansted, "where it has been transported by water, this is an exception to the usual condition in this part of the country." Now everybody knows that in Australia and California that condition is not the exception, but on the contrary a transportation of gold to the deposits at the diggings by some flood is the rule; that it really was in all cases originally water, I may say in borrowed language, "I would hesitate long with our present means of information before I could imagine a transporting medium must necessarily be *water*"—there is plenty of evidence that it has often been a fluid hotter than the temperature at which water can exist under the weight of a single atmosphere—professors as well as gold-diggers generally assume that flood to have been water in the first instance, for no other reason than that it is the liquid agent of transportation most familiar to us;—we are too apt to forget that under favourable conditions nearly every substance in nature may be made to flow as freely as an aqueous liquid.

Professor Ansted tells us that a knowledge of the geology of the subject is necessary to the practice of gold-mining in any systematic way, and then he immediately proceeds to guess at random just like any other gold-digging novice, during his first fortnight's experience, that auriferous quartz-veins are in reality only parallel bands in regular highly-inclined layers, and like coal seams form parts of large curves, a conjecture which is so very unlikely that even his admiring reviewer cannot indorse the preposterous supposition.

The accomplished professor, whom an injudicious reviewer holds up as an intellectual scarecrow, to terrify gold-diggers who venture to judge for themselves, relates that in Virginia the rocks which enclose gold veins are "within twenty or thirty feet of the surface singularly different from that presented at the depth of forty feet and more, and this difference does not admit of being explained by any ordinary or extraordinary kind of decomposition." The observation seems to confirm my previous suggestion that the auriferous constants were sometimes transmuted from the surface by an overflowing heated flood, but since the phenomenon is pronounced to be inexplicable I must submit to so great an authority, yet I cannot avoid doubting whether it be possible for any man thoroughly to understand whatever comes in his way in the gold districts.

The rocks on James River consist of schistose and quartzy beds which rest on gneissic and granitic rocks. "No doubt," says Professor Ansted, "there exist in the gneiss considerable veins of oxide of iron, and it is probable that the gold found in the district and at present extensively mined has been obtained from these irony and perhaps quartzy veins in granitic rocks." The opinion might have been adopted in London and borrowed from any former writer, without the trouble of a trip to Virginia to originate it as far as appears from any evidence adduced in support of it; with all due deference *it is very doubtful indeed* that any such imaginary, unseen, unknown, auriferous vein ever existed throughout the gneiss, which have (as is apparently implied) been ground down and deposited again in beds amongst metamorphosed strata of ancient geological age to form the nearly vertical bands or veins at present extensively mined in that part of the world.

The fundamental facts upon which any opinion respecting gold ought to be founded are not to be obtained by the flying visits of professors, who frequently repair to the gold fields only to find confirmation of the creations of their own fancy; the bases of induction must be wrung from nature by diligent and protracted efforts. A hurried ride through the gold districts to discover from what rocks the metal has been mechanically released, when "nature speaks so very plainly" that it has flowed over and been insinuated in a melted state, seems to be misdirected labour. The flattened character of alluvial gold in slates is a world-wide phenomenon and not a local exception; the grains in many cases having parallel flat sides. and at other times being of wedgelike contour, with the sharp angle downwards, and the thicker part exposed just as if a small quantity of melted metal had been poured into the gaping cracks;—not unfrequently alluvial grains have ragged surfaces without the slightest appearance of abrasion, as at the Wentworth goldfield. Slate gold generally, and other large grained alluvial gold, exists in shapes corresponding with the character of the underlying bedding rock, the conformable configuration of the metal not being in every case equally obvious, yet invariably in some degree traceable, and this fact is a reality affording a valuable basis for induction widely different from the merely conjectured existence of gold, generally diffused in a state of invisibility, upon which assumption ingenious speculators have fabricated its imaginary slow growth by means of electric forces, and thence others have strained their powers to account for its release by mechanical agencies. Professor Ansted cleverly complicates the question still further by surmising that the existing auriferous bands or veins were first mechanically deposited, and then transmuted to their present condition, the materials being derived, he conjectures, from still older gold veins in gneiss, when there is not a tittle of evidence to show that the latter gold veins ever had any existence at all!

But in taking so much freedom with the opinions of the intelligent author of the 'Notebook of a Geologist,' let us be careful not to confound his sentiments with those of his worshipping reviewer, for, probably, when Professor Ansted first saw the gold mines, he exclaimed, with deep humility, "Alas, that the best-informed men know so little about gold! The least I can do is unpretendingly to record my first impressions." But his imprudent reviewer, delighting in exaggeration, plots mischief in this fashion—"Now, I will assume that this learned professor understands everything, so I will just perplex the rude and illiterate diggers with what he says about gold." Thus a few extracts from a really instructive little book are unwisely, and perhaps ironically praised, and the least valuable portion of the whole is brought prominently forward for gold diggers to laugh at.

When deep-thinking professors, who thoroughly understand everything except the origin of the natural gold deposits, at length find, like aboriginals searching for stray horses on a wrong trail, that in seeking an explanation they have got bewildered amidst a complication of errors, and begin to discover the necessity of retracing their steps, in order to recover the proper tracks at a new point of departure, it is the bounden duty of gold diggers to lend their special aid towards putting them right again; and I submit the proposition that *alluvial gold is the product of a lava or trappean overflow* as the point whence renewed inquiries ought to commence. That some portion of the mixed trap or lava was perishable is an assumption less speculative than to suppose that the existing solid remnants at the gold-fields comprise all the products synchronously upheaved. Whether a relatively greater or less quantity of gold overflowed or remained in quartz veins to be degraded by explosion, aqueous abrasion, slow decay, or other mode of disintegration, seems to me of less consequence than the principle involved in the foregoing proposition.

The Rev. W. B. Clarke long ago declared that the geological relations of gold indicated a trappean origin, and suggested that steam might have conveyed the auriferous matter upwards. Sir John

Herschel, a very high authority, views the matter of volcanic eruptions in general as being at the time of their upheaval composed of mixed masses of lava and *water in a state of ignition* forced up through cracks in the earth's surface produced by contraction in cooling "to such a height that the water can become steam when up comes a jet of mixed steam and lava." If we accept that explanation of the general nature of volcanic action, and assume those agents to have been the media of conveying gold to the surface, it follows that what some have facetiously called the romantic notions of the Rev. W. B. Clarke, about the formation of gold by volcanic action and steam, were unfaltering steps in a right direction, on a path where previous leaders had gone astray and misled their too credulous followers.

It appears from a late publication in England that a blundering Nottingham editor, in attempting to explain the meaning of Mr Hargraves respecting the gold formations, lost himself in a sad confusion of crude ideas; but since the same ill-informed individual carelessly issues a tissue of falsehoods in stating that Mr Hargraves was a flockowner near Melbourne, whose sheep would have been worth a vast sum had he not sold them to go to California, though it is well known in the colony that Mr Hargraves never was a sheep proprietor, nor in any way engaged in the pursuit of sheep farming, nor ever settled near Melbourne, the reader must unavoidably entertain a contemptible opinion of the intelligence and veracity of the editor of the Nottingham newspaper. There is no knowing what nonsense such neophytes may make out when they begin to speculate upon the origin of gold. I expect that we shall yet see the best publication on the subject proceed from New South Wales. I am, Sir, &c.,

Sydney, 30th March, 1855. SIMPSON DAVISON.

To my next preceding letter the following anonymous reply was given in an address to the Editor of the 'Empire,' which, had it been duly signed with the name of the supposed author, would have been as desirable a *finale* as I could possibly have wished for, and as it is may fairly be accepted as an honest expression of the writer's sentiments, who veils but thinly his identity with a previous correspondent under a new signature, in thus finally expressing himself on ALLUVIAL GOLD DEPOSITS.

SIR,—Mr Davison, in some recent strictures on Professor Ansted and his Reviewer, states, in passing, that his published views relative to alluvial gold deposits have gone unchallenged. In so far as this regards the diggers, one can scarcely wonder that, as a class, they should be uninterested in a purely scientific argument, and unable to comprehend it; but that a theory so beautiful and comprehensive should have elicited no attention from those who might be supposed qualified to judge of its merits, is to me a matter of much surprise. Perhaps, here also, the explanation may be found in the circumstance, that while the digger is too exclusively practical in his habits, the geologist is too purely scientific; and the two, who can so advantageously compare notes with each other, are seldom united in the same person.

For my own part, if I venture to record my conviction that Mr Davison has stated and proved the first great fact in connection with the deposition of gold, namely, its precipitation from a volcanic fluid, and the subsequent destruction of the soluble portion of the lava, it is not that I am able to criticise or confirm his theory in minute particulars, but because that theory, and no other, meets all the prominent facts of the case.

Nature, indeed, speaks very unequivocally on the subject, as far as regards the general fact that gold has moulded itself to the form of the bottom, or bed rock, and most men working on the diggings have, in a vague way, adopted views in accordance with it. But other and even more striking circumstances—as the almost invariable association of alluvial gold (when in abundance), with a pipe-clay or "soft bottom," —and its occurrence in veins or continuous lines of deposits, are in nowise explicable by the *ordinary* notion of volcanic agency, but would seem to indicate the operation of forces more regular and uniform than this may be supposed to have been.

But, on the other hand, those who declare for the mechanical release of gold from the rock, and its transportation in the metallic form, by means of water, and who exemplify in the working of their sluices the gravitation of the larger masses, and the more superficial distribution of smaller particles, fail likewise in accounting for the regular lines of deposits which characterise all rich localities, to say nothing of the various impossibilities involved in the supposition.

A priori, then, there is a necessity to infer some other than igneous or aqueous agency, and a reference to chemical forces would be almost imperative, even if Mr Davison had not rendered their operation so intelligible as he has done in the sketch of his former letter.

I am, Sir, your obedient servant,

Tuena Creek, April 12, 1855. A WORKING MINER.

Part Sixth.

GOLD DEPOSITS ON GRANITES.

The following correspondence, though not in chronological sequence, may be here introduced in further confirmation of the soundness of what I have advanced against the doctrine of equable dissemination of gold in granites. The first letter, published in the 'Herald,' explains the circumstances which led to it:

GRANITE GOLD ON THE ROCKY RIVER.

Sir,—The enclosed account from a thoroughly practical miner of the gold-diggings on the Rocky River, in New England, is so pregnant with interest to all who are conversant with the subject, whether in the gain-seeking sense, in which it may be mostly viewed by operative diggers, or as a purely speculative inquiry, that I take the liberty (although without any express permission to do so) of forwarding the communication to you for publication.

The writer, Mr Lawrence Potts, formed one of a party with Mr Hargraves, myself, and other persons from this colony, in California, in 1849, and was then elected jointly with me to prospect on behalf of the temporary association which we there arranged for the purpose of gold-mining. No man ever pursued his calling with greater perseverance and diligence than did my companion Mr Potts, and in the valleys of the Tuolumne and Stanislaus Rivers we prospected together through many toilsome and wearisome days. For some time past I had lost sight of Mr Potts, until lately I observed it stated in your columns that one of this name was connected with a gold prospecting association on the Rocky River, who had been there resident for some years, and who was highly respected by all the digging community in that quarter.

The Rocky River is one of those localities where alluvial gold is most abundantly found upon a granite bedding rock, and in which an obviously existing connection of the precious metal with the granite masses beneath has afforded much matter for philosophical speculation in the official reports of the Rev. W. B. Clarke.

The readers of your journal are aware that a few years ago Sir R. Murchison, upon the alleged authority of the Rev. Mr Clarke, solemnly informed the several learned bodies of which he is so distinguished a member, and the public generally, that in Australia gold is found equally diffused in visible grains through the granite itself! On reading the paragraph relating to Mr Potts, I thought that his long experience among the granites in New England would be good authority on the subject, and I immediately addressed several inquiries to him, dwelling especially upon this one question—Has gold ever, in any exceptional cases, been found by yourself or acquaintances, equally diffused in grains through the mass in granite? The reply is before you.

Whatever credit may be due to Sir R Murchison for having propounded or advocated certain hypotheses concerning the position of gold-bearing rocks in physical geography, but little can be said in favour of his crude conjectures, when they are regarded from a geological and mineralogical point of view. Mr Potts is a thorough-going gold-miner of nine years' experience, and in my opinion his modest remarks possess more intrinsic value, are more reliable in fact, and justly entitled to greater weight than all which that illustrious *savant* has ever written on the subject of gold in its stony matrices, and the relation of these to the free gold grains in placer deposits.

I am, Sir, &c.,

Sydney, 3rd June, 1858. SIMPSON DAVISON.

Annexed is the letter above referred to, which bears date Rocky River, 27th May, and is addressed to Mr S. Davison, who has obligingly placed it at our disposal.—[ED.]

MY DEAR SIR,—I received your favour of the 15th instant, on Tuesday last, which, being the day of our committee meeting, I had the pleasure of reading to a large number of miners present. No one could state an instance of having found gold in the solid granite, though they have in quartz-threads intersecting it. The custom in these diggings is to chip the bed-rock to a depth, seldom exceeding one inch, though generally only one-half. The drift is composed of quartz-pebbles, and white or red sand, through which are thin veins of heavy black sand; with pipeclay (white and red), and ironstone above.

In my own experience on the Tuolumne, in California, I have known one foot of rotten granite pay well for washing, but at the same time it was soft and greasy, and could be spitted out; it failed to pay when we came to the hard rock. I perfectly agree with you that granite is not a matrix. If it is, why should we not have heard of some seam paying for crushing?

I never found gold without the presence of quartz, though I have certainly found quartz without gold, though, perhaps, I did not look in the right place.

I intended sending a sample of stone we call white rock (for want of a better definition), containing a small quantity of gold, got immediately above the bed-rock, in the drift, at the depth of seventy feet. The same rock, when cropping out of the surface, as at Mounts Jones and Welch, and Sydney Flat, is a good indication of gold. I believe the gold on this sample is only washed, as I have failed in finding but on the surface; I will endeavour to find it, and forward by next mail. I wish you had time, before your departure for England, to pay these diggings a visit, where I should have pleasure in making you welcome; you would find much to interest you.

Hoping you will have a pleasant passage, and thanking you for your kind expressions of feeling towards myself, I remain, &c.,

LAWRENCE POTTS.

Just previously to writing the foregoing letter, I had discovered on reference to the year 1853, not only a statement of the interpretation which Sir Roderick Murchison had put upon the Rev. Mr Clarke's numerous assertions of alluvial gold being *derived from a granite matrix*, but also the denial of a reviewer in the colony, that the Rev. Mr Clarke had ever meant to state that gold is sometimes diffused through the granite itself; so that this alleged authority in confirmation of the suggestion of Humboldt, that "gold is sometimes disseminated in an almost imperceptible manner in the mass itself of the granite rocks, without the ramification or interlacing of any small veins," had, if this denial were the truth, never been the intended meaning of the Rev. Mr Clarke; it appeared then that the alleged fact existed only in the imagination of Sir Roderick Murchison, and had originated in a misreading or misunderstanding of the meaning intended to be conveyed in the official reports. The Rev. Mr Clarke being a contributor to the local press, at the time of publication of the annexed Review, in which the explanation appears, the article may probably have proceeded from himself.

REVIEW (*From the 'Sydney Herald,' 24th Dec.* 1853.)

ADDRESS TO THE ANNIVERSARY MEETING OF THE ROYAL GEOGRAPHICAL SOCIETY. London, 23rd May, 1853. By Sir R. Murchison, G.C.St.S., D.C.L., M.A., F.R.S., Member of the Academies of St. Petersburg, Berlin, Copenhagen, and Corr. Inst. of France, &c., President.

We are induced to notice this publication, in consequence of the desire of the author that it should be noticed, as we infer from the fact that several copies have been sent to various parties in the colony, including ourselves among the number; and because it contains a notice of the gold and geographical exploration of Australia. Sir R. Murchison is well known as one of the most active and untiring philosophers of the age, whose early life as a soldier induced habits of order and enterprise, which have been matured by constant exercise in the field of geological research; and added to this, his natural quickness and capability of seizing, at a glance, the general features of a problem, have rendered his reputation as brilliant as any one in the present century.

But, like many men of inferior talents, he is somewhat jealous of that reputation, and hence during the late excitement respecting the gold of Australia, he has exhibited himself far more touchy upon some points than might have been expected of him. We understand, from the motion of the Colonial Secretary, on the 13th instant, he has made request to the Government, to have some early conjectures of his, respecting the future wealth of this colony, put on record in the colonial archives. To this we see no objection whatever, it is his due, and we wish all honour to be done to him; and we shall be happy if what a man of distinguished scientific character in England calls his "lucky guess," be set down to a far higher order of intuition. There has been, as our readers know, a good deal of controversy upon the question of priority as to the guesses or intuitions; but we have every reason to believe that there has never been any attempt made to deny to Sir Roderick what he can justly claim upon undoubted evidence, and we are quite sure no one has endeavoured to rob him of a single laurel. His name stands far too high for any attempt of the kind to succeed, even if there were folly enough in any man to aim at it. And if Sir R. thinks, that hitherto his fame has not been sufficiently extended in Australia, we hope he will see, by this notice of his Address, that we are not of the number of those who would willingly contract it. But common justice to the Press of this colony leads us to state that there has been exaggeration in England as to the effect of his announcements of gold in Australia, on the mind of the public here, for there never was, as is well known, any "excitement" at all about it; and though Mr Smith did state that he was induced to look for gold on the strength of the announcement, and yet, though when pressed to state where the gold was found, he did not or could not tell; yet both Mr Clarke, who has some claims of older date that are established, and Mr Hargraves, who taught the colonists to wash for gold, and first succeeded in creating excitement, have each declared that they owe nothing to Sir Roderick, either in one way or the other. It has been long settled that, whatever be the merits of these three gentlemen, they are, at any rate, independent of each other. And now to our proper business, which is to set before our readers the intelligent remarks made by Sir Roderick, in his Anniversary Address to the Geographers of Great Britain.

Australia.—Its Gold—Its Geographical Exploration.

"The golden shower which has been distributed over our great Australian colonies, has been realized to an extent beyond any imaginable former estimate; for no one could have attempted to predict the quantity of auriferous wealth of any given spots in unexplored regions, though a geologist like myself, anticipating from their structure, in 1844, that gold would be found in them, was aware, as early as 1846, that specimens of the precious metal had even then been detected.

"The coincidence of mineral structure which I pointed out between the eastern watershed of Australia, as described by Strzelecki, and the Ural Mountains, which I had examined, is now seen to be accompanied by other phenomena common to the two chains, to which it is well to advert. The Ural Mountains are notably auriferous on the eastern or Siberian side only; and, as far as surveys have gone, it would appear that one flank only of the Australian watershed exhibits rich accumulations of gold débris; but in this case, it is the western, or interior side of the range. It is, however, to be observed, that in his recent exploration of vast tracts along the southern frontiers of the colony of New South Wales, where they unite with the province of Victoria, as described in the reports printed by order of the House of Commons, the Rev. W. B. Clarke has shown that, whilst no copious deposits of large-grained gold (with a partial exception near Araluen) have been found on the banks of those rivers which flow to the east or south, yet, still that in many localities, and over a very wide area, fine-grained gold is disseminated through the alluvia. But still the fact remains, that it is only on the interior flank of the watershed that the great prizes have been found. Such are the tracts of Victoria, whether around Mount Alexander and along the banks of the Loddon, which flows into the Murray, or the Oven Diggings to the north-west: such are the rich accumulations along the feeders of the Macquarie, to the west of Bathurst; those near Wellington, as described in a report of the Surveyor-General, Sir Thomas Mitchell, and numerous fresh auriferous spots noticed by Mr Stutchbury, in his successive mineral reports; such again are the numerous creeks which supply the head waters of the Peel River. At the source of the west-flowing Peel River, the Hanging Rock of the colonists is an eruptive boss, like the Katch Kaner of the Ural, from which various fissures and chasms are said to radiate, in minor streams meander through slaty and quartzose rocks, which have been the chief sources of the gold ore. In like manner, Mr Stutchbury describes numerous protrusions of granitic, syenitic, and other igneous rocks, through metamorphosed strata of schist, sandstone, and limestone of the palæozoic age, around Wellington and in the affluents of the Macquarie. Noticing the same general cause and effect in the loftier southern Alps of this chain, Mr Clarke goes still further in his effort to discriminate a succession of igneous phenomena, showing (if I read his reports aright) that the gold is sometimes diffused, though in minute quantities, through the granite itself. The same author has also discovered traces of quicksilver and tin."

We have no intention to comment upon this very interesting and lucid address, further than to state that, on reference to Mr Clarke's reports (to which the author refers), we find that gentleman does not state that "gold is sometimes diffused, though in minute quantities, through the granite itself;" but, if we read his reports aright, that gold is abundantly diffused in granite throughout Australia; and he has shown in some of his late reports, that auriferous granite also exists on other eastern waters besides those of Araluen. We must leave that, and any other points worthy of discussion, to another tribunal; but, with the facts before us, and the continual reports of our correspondents from the granite gold-fields of the Ovens, Araluen, Rocky River, &c., with which our columns have teemed, we think the great

English Geologist has not given full weight to the great point in which Australia differs from his own particular Ural.

To my next preceding letter the Rev. Mr Clarke replied in a public communication, signed with his own proper name, from which it is apparent that the review just quoted was not then present to his memory. Neither does he seem therein clearly to realize the meaning that "equable diffusion of visible gold as an integral part relates to granites said to be auriferous *when not interlaced with small veins of quartz*," to which subject my SIXTH PUBLIC LETTER is chiefly addressed. Much of the present reply relates to invisible gold, and is therefore an *ignoratio elenchi*, and foreign to the question. The Rev. Mr Clarke thus wrote to the 'Herald,' concerning GOLD IN GRANITE.

SIR,—It is a very long time since I have written anything on the subject of gold in Australia, but I have received a refresher and must awake. In your impression of the 7th instant, is a letter from Mr Simpson Davison, on the subject of gold in granite, accompanied by a letter to him from Mr Potts, late of California, and now of the Rocky River.

By "granite," I find Mr D. means "solid granite," "hard granite," and granite in "mass." It is therefore said by Mr Davison that Sir R Murchison solemnly informed the world that I had authorised him to state that "in Australia gold was found equally diffused in visible grains through such granite itself."

On looking over what Sir Roderick has really said respecting me, in print, I can find only this passage, which seems to bear upon Mr Davison's reference. It is in 'Siluria,' p. 452.

"Whilst the most prolific sources seem to have been the quartzose veinstones which traverse the older slates, we are further instructed, that in Australia, *as in the Ural Mountains*, there are *tracts wherein* gold is diffused in *small* and *almost invisible* particles through the body of *certain granitic rocks*, especially those (according to Mr Clarke) which are hornblendic or syenitic."

This is all, so far as I know, to which I am pledged.

Now, when Sir Roderick wrote this passage, he had read only those of my reports which relate to the country south of Sydney, in which the gold-fields of Araluen, Mitta Mitta, Snowy River, and other Alpine regions are described. I have, therefore, carefully searched those reports, to see if, by any chance, I had left unguarded by what is said any opinion on the question mooted by Mr Davison.

I now confidently challenge any individual to point out a single statement which affirms that "in solid granite," "hard granite," or the "mass in granite," gold is "equally diffused," as Mr Davison has it, "in visible grains."

The trouble I took to ascertain the real facts of the case led me to a conclusion not of that kind, but of another kind, viz., that it is in "decomposed," "disintegrated," "transmuted," "hornblendic granite," alone, that gold does so occur in Australia. And I stated clearly enough, that such granite is nearly allied to *talcose rock*, which all through the United States is the matrix of gold, wherever gold occurs.

The absence of such granite, so far as I believe, is one reason why in Tasmania the supplies of gold must be limited; the granites which I saw there being of a different character from that of the grey hornblendic and syenitic granites of the Rocky River, Araluen, &c.

If you will be so good as to reprint the following remarks on this subject from my report of 21st October, 1851, your readers will perceive that I have only stated in other words what both Mr Davison and Mr Potts confirm, that gold is found in "rotten granite," in "soft granite," or what I call "disintegrated" granite, as well as "modified" and "transmuted" granite.

[The extracts from the Report of this date are in APPENDIX D.]

I have mentioned, moreover, gold in "*granitic detritus*" at Warri, on the Shoalhaven, in my report of 10th November, 1851; and in my report of 24th December, 1851, I say: "Near Mitta Mitta, and creeks on the left bank, gold is very abundant in the *decomposed* and *decomposing granitic detritus*." I mention, also, that in the Alps I found gold generally "*connected with* granite of some kind," and "its occurrence in *granitic rocks* of a *certain* class." Further, I explained that the "*habitat* of the gold was a *peculiar species* of granite *approaching the talcose rock of America*."

At Mount Elrington I produced a lump of similar granite, which was taken from a hole dug in Major's Creek; and Mr Hargraves, who was there at the time, doubting my statement that it was auriferous, broke up the lump by my desire, over a prospecting pan, with a hammer, and the gold fell out. So was it on the banks of the Mitta Mitta; the gold fell out of the soft granite when struck by a hammer. I sent a specimen of this to the Government at the time. I found it lying unnoticed in 1853, and the same specimen was exhibited in my collection in Paris in 1855.

There were a few other remarks in subsequent reports, in which I have spoken of gold as directly traceable to the existence of granite, as lying upon it, and mixed with fragments of the detritus of granite.

It is from these statements, and no other, that Sir Roderick Murchison compared what I described here, and what he had found in the Ural, and therefore, as what I stated is confirmed by Mr Davison and Mr Potts, I do not see what end is to be gained by calling in question the statements against which Mr D. excepts.

But as Mr D.'s *venue* is the Rocky River, it will be well to see whether I am in fault in my subsequent reports on the Northern Gold-fields.

In my report of 14th February, 1853, I said: "Gold in this part of New England is most abundantly found where granite has been *disturbed* and *overflowed* by *hornblendic trap*." (Surely this is well established by the late researches about the Rocky River.) I speak, therein, of gold and granite, "*under certain conditions*" as more general than any other association, instancing Mitta Mitta, the Ovens, Moamba, &c. But, as if shutting out "*all controversy*," I have defined my opinion in these words, words confirmed by what Mr Potts himself says, of gold on the "*surface of granite;*"—"I think in that portion of the granite which was once, or is now, in contact with trap of some kind, that is to say, on the *surfaces* of the granite, or at the *outer portions* of the formation, in contact with some other formation."

The whole of my speculations come to this; and the whole of my attempts to explain gold in granite are resolved into the deduction, that whatever gold may have been elaborated in granite must have been in the *superficial portion* at the *outside* of the original masses.

These are my words—"Now, what has occurred in the Araluen gold-field and on the Mitta Mitta (in both of which localities I separated gold from granite by the blow of a hammer) has occurred on the Rocky River.

"In one of the workings I pointed out to the gold-washers a *decomposing flaky covering* from a large *drifted* mass of granite, with particles of gold visibly apparent to the naked eye, and this could not have been washed into it. It was there, because the granite in which it was found contained it before the boulder had been rolled down from above. It belonged to a mass which, in all probability, had been at the *outside* of the granite formation. . . .

"Some of these having been *denuded*, as we have seen already, and *much disintegrated and decayed*, the heavy gems and the heavier gold have been left in the granitic sand, and in the scaly *soft surfaces* of still *decomposing drifted* blocks of granite, now filling the creeks and river beds, and which *once* belonged to the *upper* and *outer portion* of the granite masses."

After this, I have gone on to speculate as to the probable abundance of gold in the other similar granite tracts of New England, and may I not venture to ask—was I deceived? Have not all my indications been proved true to the letter? Does not the Uralla itself—does not the Glen Elgin gold-field—does not even Boono Boono shew that my views were correct?

It is certainly some satisfaction to me, that not one statement I have made to the Government has been proved fallacious *thus far;* and that day by day, and by the strongest concurrences, there has been, during five or six years, a continuous verification of my reports. I take Mr Davison's and Mr Potts's letters as confirmatory of what I have deduced not alone from observation, but by induction from acknowledged principles.

And I now repeat that the future of this colony, as relates to its production of gold from tracts of granitic formation, will be infinitely expanded; and that wherever a soft *surface* of *hornblendic granite* can be found, or where such surface can be worked, gold will and must be obtained.

And having said this, I will explain how gold has been held in such outer surfaces of granite originally, not as Mr Davison puts it, "*equally diffused*, in *visible grains*," but held in sulphuret of iron—in iron pyrites—from which the whole of the gold in some countries is procured. The decomposed granite holding gold is generally *ferruginous*. This is occasioned by the decomposition of the iron; and I will add here, with a celebrated geologist, that there is a question of infinitely more difficulty, and equally striking with that of the association of gold and granite—viz., the association of sulphur with granites and connected metamorphic formations.

I will go further, and say, that before any person denies the possibility of gold in portions of granite below even the present surfaces, he should ascertain by distinct examination whether it may not exist. Gold has been proved recently to exist in all metals; and we know it is universally found not only in such portions of granite as we have considered, but in other formations, and, to use Sir Charles Lyell's words, in *all*. It is elaborated by vegetable growth in soils where there are no pretended geological indications: it is found occasionally in rain water; it may, for anything I know to the contrary, exist in the air, vaporized and afloat, as reguline.

My view of its occurrence even in *quartz*, which is allowed by your correspondent to be a matrix (and what is quartz but a constituent of granite?—and what are the threads Mr Potts speaks of but segregations of silica?) owing to the action of steam, is confirmed by a recent determination of Mr Sorby (which you have published an account of in Monday's 'Herald'), who says, that all crystals of *quartz* and *granite* contain innumerable cells, charged with *water*—and that, therefore, hypogene rocks are not simply igneous but *aqueo-igneous*, and formed by *pressure* under the ocean. This he has determined by the microscope.

With revelations of this kind coming to light, it is wasting time to dogmatise on the observations of those who can scarcely know what they see with the natural eye alone, or on speculations which, however honoured to-day, may to-morrow be consigned to eternal oblivion.

I cannot resist quoting here a passage from a work published in Petersburg and Paris in 1856, by a member of several Imperial societies, which will show that my views respecting the formation of gold in veins by the aid of vapour or steam are commending themselves to others, and it is with this object only that I quote it:

"Gold and silver were formed by the action of fire, or, as it is called, by the igneous way."

"Gold and silver penetrated to the surface of the earth, traversing cracks and crevices, under the form of vapours. . . . If, then, the formation of gold and silver was accomplished by subterranean ignition, it is evident that the two bodies passed through *all the beds* by the cracks and crevices resulting from the action of igneous substances darted from the bowels of the earth, and, moreover, that the metals presented themselves originally under the form of vapors or gas, or in general in the liquid state. It is easily comprehended from this, that those auriferous and argentiferous vapors rising through these fissures, ought to be deposited in crystals. It is thus that these vapors, in traversing the rocks or minerals, which they meet in their passage, and in union with them, formed the ores and veins which we now see. It is for the same reason that gold and silver cannot form enormous masses like granite and the other metals."—*Translations from a work* "*On Gold and Silver,*" *by Narcès Tarassensko, Otreschkoff, Petersburg.*

Let all gold-seekers bear in mind that *no portion of the original surface of any exposed formation is now in existence.* They will then see, that, though gold is not *now* traceable in any but the *superficial decomposing ferruginous portions of granite*, ages ago, what is now considered alluvial, when formed on granite, may once have been formed in the still higher but now totally disintegrated or destroyed surfaces of granite; and therefore, "gold in granite"—or gold from granite, is not a misnomer, nor a mere formula of speculative theory. The Rocky River (Uralla) has proved this—viz., that the gold, however it got thither, lying on the top of the granite, and (as Mr Potts admits, as in California) in the superficial portion, is now covered not only by deposits of other matter, but again by an overflow of hard basaltic lava, as in Victoria, in some cases one hundred feet thick, through which the gold is reached. Such gold is venerable from age: for if alluvial, it belongs not to the alluvia of this epoch.

Hereafter, perhaps, we may find gold still lower, though not perhaps equally diffused in granitic rocks; but except in sulphuret of iron I have not found it in hard granitic rocks. Yet I consider it would be rash to conclude hastily that, because a thing has not been seen to exist, it will never be seen; and if the statements of Hopkins are correct, what is to prevent such discovery being yet made?

It may serve as an amusing pendant to this long discussion if I mention that, from the *facts* I have stated in my reports, a gentleman who read them in the British Museum, and, giving me more credit than some of my friends has, on the strength of my description of *gunpowder gold* (the gold which is nearly universally found when in connection with granite, and is different to all other gold), invented a peculiar machine for the washing and separation of such gold; and he proposes shortly to set it in action in this colony. It is not impossible, therefore, that we may know more hereafter than we do now respecting the possible and probable alliance of gold and granite.

In the meantime it may be well for those who deny the existence of "gold in granite" in Australia, to weigh well the following examples of such an existence in other countries, as related by other observers and geologists. But I again remark, that *all granites* are not in the category: it is only in decomposed hornblendic, syenitic, trappean granite, that it has thus been found at present in Australia.

(1.) "In my own experience on the Tuolumne, in California," says Mr Potts, "I have known *one foot of rotten granite* pay well for washing, but at the same time it was soft and greasy, and could be spitted out."—*Letter in 'Herald,' June* 7, 1858.

(2.) "The rocks *in which* the gold of the Ural Mountains and Siberia is found are very variable in their nature, including *granites*, metamorphosed schists, and other igneous and altered rocks."—*Ansted's 'Gold-seeker's Manual,'* p. 9.

(3.) In Brazil, "the rock, where exposed, appears to be primitive *granite*, inclining to gneiss, *with a portion of hornblende*, and frequently mica. The soil is red, and *remarkably ferruginous*, in many places apparently of great depth. The gold lies, for the most part, in a stratum of rounded pebbles and gravel called *cascalhao*, immediately incumbent on the solid rock."—*Id.*, p. 11.

(4.) "It is, however, derived from the *granitic* and gneissic rocks, and particularly from those veins of quartz which run through them." —*Id.*, p. 59.

(5.) "The gold of commerce is obtained chiefly from sands and gravel produced from *disintegration of the parent rock on the spot*, or transported by water from districts where much gold is disseminated."—*Id.*, p. 51.

(6.) The *Caldieros*, or those parts in the body of the mountains where the metal exists in large masses, and almost pure, are of two kinds; those in *solid granite rock* seem to be chambers, whither the menstruum which held in solution the precious ore has tended,—where it has rested and deposited the metal with which it was saturated."—*'Luccock on Brazil,'* 1808-1818.

(7.) "In the well-known and important mines of Berezovsk, near Ekaterinburg, *granite* dykes or bands in talcose schists and clay-slates contain the gold particles."—*Ansted*, p. 53.

(8.) "These mines (Berezovsk) are interesting, as offering the only subterranean shafts by which gold is extracted from the parent rock. The chief fundamental rocks are *talcose*, chloritic schists and clay slates, like those which prevail around Ekaterinburg, and these have been cut through by parallel bands of felspathic rock called '*beresite*,' which M. Rose considers to be a *decomposed granite, a continuation, in fact, of the granites* of the Shartash Lake and Ekaterinburg. The band of beresite, which bears, in truth, the aspect of a metalliferous lode, trends from north to south, and contains within it many veins of quartz, in which the gold occurs."—*Murchison's Russia and the Ural*, p. 477.

[This is a similar case to that mentioned by Mr Potts, of quartz threads intersecting granite.]

(9.) "I know of no primary rocks of the above composition of quartz and felspar, and the *friable, ferruginous granites, with bright yellow mica, but what contain gold.—Evan Hopkins's Geology and Terrestrial Magnetism*, p. 55.

(10.) "This metal is never found mineralised in nature, but *enclosed commonly in iron pyrites*, and frequently alloyed with other *metals*. . . All the *ferruginous and friable granites*, containing yellow mica and pale yellow quartz, which are subject to *disintegrate into spherical masses, produce gold in grains* during the change. The *auriferous granites* bordering the Pacific Ocean, as well as those situate in the interior of the Americas, *which I have minutely examined*, show this effect in a striking manner. The internal crystalline character of the *auriferous granite* changes *as it approaches the surface* by an almost imperceptible gradation into a *kind of globular structure, like a coarse conglomerate*."—*Id.*, p. 53.

(11.) "By bruising and washing the most compact quartz in the auriferous granites and porphyries, we detect gold in an impalpable state of dissemination, forming, in fact, a portion of the compound, like the salt of the sea; but it is in the small fissures only or in the vacuities of the oxidating crusts that we find the granular or massive gold formed by the process of crystallisation, which is constantly going on in the moist rocks."—*Id.*, p. 52.

(12.) "Gold is sometimes found in gneiss, granite, and porphyry. It is often contained in pyrites. By decomposition it stains the rock with iron rust."—*Vide Article Gold and Mineralogy*, p. 549.

(13.) "Mr Clarke leaves no doubt that we may find gold in different *granitic* rocks, which in Australia, as well as in other regions, present extremely various mineralogical characters. He has recognised, for example, on the banks of the River Mitta Mitta, that the gold is disseminated in a variety of *decomposed granite*, which approaches nearly the auriferous talcose rocks of California."

"It would be easy to cite other numerous examples of the position of gold, either in *granite* or in *schists, crystallised with orthose, which are decompositions of granitic rocks*. I will content myself with mentioning here the deposits of gold which are known in the Alps of France and Piedmont. I will remark, moreover, that even in Brazil, *granite* is often the rock which holds the gold."—*Translation from Delesse, Gisement et Exploration de l'Or en Australie. Paris*, 1853.

I have now, I hope, said and quoted enough to save me from any charge of misleading Sir R. Murchison, or of inducing him to "solemnly misinform the learned societies of which he is a member, and the public generally," by proving that I have said no more than, and not so much as, some others, geologists, mineralogists, chemists, and physiologists, have confirmed—and what even, when regarded with strictness, both Mr Potts and Mr Davison also confirm.

14. The subject is one of so much interest, that I have entered more fully into it than either my leisure or your space would otherwise justify; but, in the hope that good may accrue to some from such an illustration not, perhaps, fully considered before, I have intruded to this extent on your forbearance. Believe me, &c.,

W. B. CLARKE.

The necessity of employing A THEORY, in order to describe facts, could hardly be better exemplified than in the preceding observations from the Rev. Mr Clarke, on the existence of gold in a granite matrix. With all due respect I cannot concede that when formerly using so often in official reports the expression "granite matrix," in contradistinction to quartz matrix, the Rev. Mr Clarke meant nothing more by the term than drift granite, decomposed granite, granitic detritus, and the decomposing flaky covering of granite; for none of these enumerations are, in fact, true granite, but only the loose remains of granite which since decomposition may have possibly admitted foreign substances to intermix mechanically with them; neither could the term matrix apply to the molten condition of granite. My own examinations of the auriferous granites in California were made before the Rev. Mr Clarke's official reports were published, and the question of equable diffusion discussed in advance of the explorations which the reports describe. The writer of them, judging from *primâ facie* evidence, was then prepossessed with precisely the same views on the subject as Sir R. Murchison evidently was at the date of the address which the reviewer criticises. That great changes in opinion did occur to the Rev. Mr Clarke as colonial explorations progressed, may be gathered from the following passage, which possibly refers to this very question. In an official report, dated on the 24th November, 1852, the Rev. Mr Clarke observes that: "Geologists at home have considered we can, in Australia, know nothing right but what we glean from them. But it cannot be a matter of indifference to those who are interested in the advancement of Australia to know that Australia itself is likely to throw considerable light upon questions, as it appears, imperfectly understood at home. I cannot but confess that some of the dicta of science as held in Europe, respecting gold, however accurate in general may be the deductions from facts exhibited in Europe, are gradually becoming modified in my estimation of their value as I extend my investigations in Australia." It may be contrary to professional etiquette and altogether *infra dig*. for a man of science to confess adherence to any theory originating only with practical gold-miners, who are not included within the pale of scientific privilege, but has conviction been on that account the less obviously brought home to the mind of the geological authority appealed to, since his late extensive examinations have supplied him with more abundant data? Although the Rev. Mr Clarke seems unwilling to take the responsibility of having ever attached the same meaning of equable diffusion of gold in grains to the expression of granite matrix—as Sir Roderick Murchison clearly did lately, and as my friend Mr Rudder certainly did formerly, during our examinations in California—it is now only the more gratifying to find that the Rev. Mr Clarke has in reality arrived at the same conclusions with myself as to the actual facts. Granites are admitted to be rocks of igneous origin, and the small veins or threads of gold-bearing quartz in granite are no doubt segregations of silica which have, as I infer, been derived from molten granite during the process of cooling, while the segregations appear to have occurred chiefly on the top surfaces and resulted in nearly vertical small veinstones of quartz, as well as in a larger volume of molten matter which overflowed the more viscous mass. Although silica is no doubt a constituent part of all granites, massive granite does not, according to my experience, contain within itself visible gold, except in the linear segregations of silica, which are more commonly called quartz-veins when large, or quartz-threads when the veinstones are more diminutive. The universally small size of granite gold grains and the occurrence of the gold-bearing silica in threads in granite, very clearly indicate, I think, that the auriferous segregations have been less decided, when visible as veinstones *within* or as surface gold *upon* granites than when the segregated matter has rolled over a slaty floor or been arrested within the white quartz-veins which penetrate through walls of slate. It is amusing, after all the pains I took in California to satisfy myself on the question of "gold grains equably diffused in granite," and after reading the Rev. Mr Clarke's elaborate reports wherein gold is so often described as having been derived from a granite matrix, and after understanding, with Sir Roderick Murchison and with Mr Rudder, that this expression meant *visible gold in granite when not intersected by any small veinstones containing visible gold*—to find now, on explanation, that such an interpretation is all a mistake and never was intended by the author of the Reports.

Mr Hargraves, at my suggestion, has in a book since expressed his belief that the gold washed out by him near Braidwood, on the occasion just related, had only been cemented accidentally to granite, and ought not to be considered an integral part of it.

Mr Evan Hopkins's observations on granites have led him to conclude in effect that *visible gold grains are not contained within either the solid granite or the spherical masses*, but the metal he imagines has only been brought from an invisible state of diffusion into palpable grains outside of them during slow decay. Whatever may be thought of the process by which Mr Hopkins suggests that the gold grains resting upon granites have been produced, the testimony as to the existing physical conditions is altogether against the doctrine of "equable diffusion of gold in grains through the mass in granites." Mr Sorby's microscopic observations are also far from having determined that the gold-bearing granites have been formed by pressure under the ocean.

The uselessness of wasting time on speculations which, however honoured to-day, may to-morrow be consigned to oblivion, may be very true indeed as regards speculations which aim at no practical end; but when I reflect that, by consigning to oblivion the *equable-dissemination doctrine* and the *abrasion-of-quartz hypothesis*, and that, upon my own observations made in nature, I came to the conclusion that the moulding of alluvial gold upon slates in California, and the non-existence of gold in dissemination, were facts deserving of a good deal of speculation; and when I remember that, upon the evidence which I had collected on these questions, I required Mr Hargraves to examine the slates and granite rocks, which I had seen previously in Australia, and by a written letter with verbal directions given for that purpose, instructed him that if gold should in Australia be so found moulded upon the slates, and in a subordinate degree upon granites, that he should then *ex uno disce omnes*—at once pronounce that the interior of Australia comprised a large gold-bearing area, and that by this means the placer deposits in Australia were in truth first discovered through Mr Hargraves,—I can congratulate myself, at any rate, that my own speculations have not been a useless wasting of time, but have been followed by the most important practical consequences.

Where talcose rock is said to be "the matrix of gold in America," the expression is probably only intended to imply that there the massive talcose rocks, like the auriferous granites in Australia, enclose veinstones of gold-bearing quartz, or it may be that the assertion is only one of those mistaken inferences upon which I have dwelt at so much length in the sixth public letter, that the argument need not be here repeated; several other passages also just quoted from previous writers are not now admissible proofs, but merely recitations of mistaken inferences which have not been repeated by their authors on re-examination of the rocks since an explanation of the fallacy has been offered.

Mr Hopkins's approbation of the hypothesis, that invisible golden atoms in an impalpable state of dissemination in granites (Sir Charles Lyell suggests—in all rocks whatever) constitute, in fact, a portion of the compound like salt in the sea, and that in the oxydising crusts, granular and massive gold is formed by a process of crystallization which is now constantly going on in the fissures and vacuities, calls to memory the similar speculations in which I indulged in California, more especially with reference to slates than to granites,—my former inquiries being founded upon the fact of the adaptation in shape of the flat gold grains to the slate bed-rock. Mr Hopkins, in his speculations on the formation of gold upon granite, does not seem to take into consideration the correspondence in character of placer deposit gold with its bed-rock. By a slow process of crystallization golden atoms may very likely have sometimes been brought into visibility in vacuities in quartz-veins, and the process may be even now going on; but the compact gold most frequently found in quartz-veins exists there encased in solid quartz matrix, and then such an origin does not appear feasible; while the cleavage of slates in general is often affirmed to be the result of a sort of slowly operating crystallization. Granites, on the contrary, are as universally admitted to have had an igneous origin, there seems, therefore, to be the greater probability that upon slates, of the two, the metallic grains may have been shaped to the bed-rock by the same electric agent as that which possibly produced the slaty cleavage. Such a theory appeared to me, at the early date I am alluding to, one deserving of consideration after the quartz-abrasion hypothesis had been abandoned. Moisture being known to be, in certain cases, a powerful exciter of electricity, it seemed to me possible also that the gold upon slates (admitting the metal to have formed there by a slow electrical process) might have been formed more abundantly, as it is found in existing streams and water-courses *because of their continual moisture*. But granites being acknowledged igneous rocks, the formation of visible gold upon them by the method of the theory which I have expounded, now appears to me far more probable to account for granite gold, as well as for the gold upon slates and within quartz-veins; still I must again remind the reader, that it was upon the observed facts in nature that I enjoined Mr Hargraves to examine the slates in the auriferous districts of Australia, and that all theory is chiefly useful in describing or observing facts.

Part Seventh.

THE GOLD FIELDS OF CONTINENTAL INDIA.

Resuming the chronological order in which these epistolary essays appeared in the local papers, the following private letter from Mr Hargraves, then in England, will show the circumstances which brought India especially into notice.

London, 17th November, 1854.

My dear Sir,—This will be handed to you by an old friend of mine, Captain Hurst, whom I have known upwards of twenty years. He is one of the most honourable men I ever met with, and will disclose a project to you in the *auriferous* way, and should you not be engaged at your quartz-vein, I have no doubt that you will be able to enter into such an arrangement as will tend to your mutual benefit. In case you should be engaged at Wellington, I am sure you will forward my friend's views by assisting him in any way you can by your advice.

I am much obliged by your kind attention in forwarding your printed theory on the Origin and Distribution of Gold. I have not failed in bringing it forward, and much notice has been taken of it, but just now nothing but fighting goes down. War! war!! war!!! is the watchword of the day, and an old musket is thought more of than a nugget of gold. Many thanks for the 'Sydney Illustrated News.' I purpose coming out with my *Book* in about a month. I have written to you by the September packet. Trusting you will give my friend Captain Hurst every information should you not *fraternize* with him in his project,

I am, dear Sir, yours very faithfully,

Simpson Davison, Esq. E. H. Hargraves.

When the friend alluded to in the foregoing letter called upon me, I found him in possession only of the vaguest notions of any project for the development of gold-fields in India, but still he produced some interesting documents on the subject, which had been furnished to him by Mr Edward Haslewood, of London, who had, it appeared, been formerly resident at the Gongo Soco gold-mines in Brazil. The only proposal which Captain Hurst could make was the offer of a free passage to Madras in the ship "Lord Hungerford;" and probably had any credentials to the local Government officials, or introductions to influential residents in India, been then forwarded to me, I might have been induced to proceed thither. But since I had already expended a great amount of private resources in aiding Mr Hargraves, and had never received any adequate public acknowledgment for the service either from him or from the government which he served, I felt that it would be quite a Quixotic adventure to proceed without such credentials, at my own charges, to a strange land for the purpose of finding gold where gold had already been found.

Mr Hargraves's letter, though so friendly in tone, was yet more than counterbalanced in my estimation by the circumstance of my having just before its receipt obtained, for the first time, a copy of the 'Minutes of Evidence taken before the Gold Committee,' in which I found that Mr Hargraves when examined had, in reply to questions from the Colonial Secretary, and when ten thousand pounds hung upon his reply, ignored all recollection of my frequent conversations with him in California, respecting the gold-findings of the shepherd, near Wellington, in New South Wales. The testimony of Mr Lister, corroborated by that of the Messrs Tom, now showed me for certainty that Mr Hargraves actually was on the way to Wellington when they first met him at Guyong, and thence diverted his steps to Summer Hill Creek. Both these important matters were such as I alone could have explained, but when the Colonial Secretary had acted on the same occasion in the threefold capacity of judge, witness, and special pleader, to procure a sum of money which he had already promised to procure, it was very clear why my explanations were not desired ; and hence I have since in every way expressed my dissatisfaction with the partiality of these examinations.

I suggested to Captain Hurst that he should cause to be inserted in the newspapers a paragraph to the effect that Mr Hargraves, with his usual energy, had "determined to unlock the gold-fields of India," and that the ship "Lord Hungerford" was now on her way to Madras with this object in view. This pleasantry brought to publicity some communications between the Rev. Mr Clarke and the Indian Government, which were thus addressed to the Editor of the 'Herald,' on GOLD IN INDIA.

SIR,—A short time ago appeared in your columns, a notice of the existence of gold in India, coupled with a statement that, as the East India Company had shown great reluctance to inquire into the subject, a company in London had endeavoured, partly by threats and partly by milder measures, to induce the East India Company to grant a charter for the working of the Indian gold-fields, and that Mr Hargraves was "determined to unlock them."

As the matter may have interest for some in this community, and as it is but just to the East India Company to show that there is no unwillingness to turn their concealed treasures to account, I request you to print the following correspondence.

If I can find time, I may perhaps hereafter trouble you with a few remarks on the topic before me; at present, I will only add, that I am now able to state that the researches that have been made in the districts I have mentioned, have proved the existence of gold, and thus the indications of geology have been found correct, not only in New South Wales, Victoria, Tasmania, and New Zealand, in which I have previously indicated the existence of gold, but in India also. Believing as I do, that no company of adventurers from England will be able, as they expect, to draw the natives of India from their long settled habits of cultivators of the soil, and to convert them into profitable gold-diggers, I would call attention to a hint given me from India, as to the prospect opened by the gold-fields there, already "unlocked," to persons of other countries. But if such persons go to India with a design of the kind, they must make up their minds to labour on their own account, under a very different climate to that of Australia, for it is scarcely possible for any company to afford at starting, the expense of hired labour of the necessary kind. Yours truly,

St Leonard's, 22nd May, 1855. W. B. C.

No. 1.

Parsonage, St Leonard's, near Sydney,
New South Wales, 25th April, 1854.

SIR,—I have lately fallen in with a despatch from Mr Young to Captain Wingate. It contains an account of the geology of Bunkapoor, of sufficient importance to attract my attention to that district, as affording evidence of the similarity, in its geological features, of that part of India, to many portions of New South Wales, in which gold is generally distributed. The examination of the carboniferous formations of India, by competent geologists, has proved that, as regards those formations, there is an intimate relationship with those of this colony. It now appears to me, that the resemblance between portions of the two countries are continuous downwards, in the geological scale. I am, therefore, after reading Mr Young's remarks, induced to believe that, if competent search be made in the neighbourhood of the following places, auriferous deposits may be found, viz., Yebuwugee, Gudug, Misrukotee, Munumgee, Karudgee.

Should it be deemed of sufficient importance to have the soil washed for the purpose of settling the question, I shall esteem it a favour if you will be so obliging as to have result communicated to me. I am not aware that gold, although known to occur in various parts of India, has yet been found in the district I mention. If it has been already found there, you will be good enough to understand that I have no knowledge of that fact.

Having made extensive explorations, on behalf of the Government of this colony, in examining the country for gold, I feel considerable interest in the inquiry as to the probable extent of the Australian formations beyond the shores of this colony; and the question is, perhaps, of sufficient importance to be entertained by you.

I have the honour, &c.,
W. B. CLARKE.

To the Hon. the Sec. to Government, Bombay.

No. 2.

General Department.

To the Rev. W. B. CLARKE, Parsonage, St Leonard's, near Sydney, New South Wales.

SIR,—I am directed by the Right Honourable the Governor in Council, to acknowledge the receipt of your letter, dated the 25th April, 1854.

2. A copy of this letter has been sent to the Superintendent of Revenue Survey, in the Southern Mahratta country, with directions to take any steps in his power, for examining such of the districts mentioned by you, as have not been geologically explored and reported on by Lieutenant Aytoun.

3. This officer, as well as Mr Young, to whom you refer in your letter, are both at present absent in Europe, and it is possible that considerable delay may occur in completing the inquiries suggested in your letter, the result of which, however, shall be communicated to you.

4. In the meanwhile I am directed to forward, for your information, the eleventh volume of Transactions of the Bombay Geographical Society, in which you will find two interesting reports, by Lieutenant Aytoun, on the geology of various portions of the Southern Mahratta country, and especially referring to some of the localities particularised in your letter, in a manner which corroborates the justice of your anticipations regarding them, as likely to contain auriferous deposits.

I have the honour, &c.,
W. HART, Secretary to Government.

Bombay Castle, 23rd Feb., 1855.

After a lapse of three months, the Rev. Mr Clarke supplied some further information, with an address to the Editor of the 'Herald,' as follows:—

SIR,—In the month of May I published some correspondence on this subject. Being now able to state more particularly what has been recently going on in the Southern Mahratta country, I lay before your readers the following reports from Lieutenant Aytoun, of the Bombay Artillery, who has been employed in a geological survey of that country. The remarks enclosed thus [] are mine.

August 22, 1855. W. B. C.

LIEUT. AYTOUN'S REPORT, addressed to J. INVERARITY, Esq., Political Agent, Southern Mahratta Country.

SIR,—Acting on the information which you had obtained in your tour through the districts regarding the localities where gold was reported to be washed by the natives during the rains, I left Belgaum on the 5th June, and proceeded direct to Byl Hongul and Belwuddee, in the basin of the Mulpurba.

On the morning of the 10th I started, at daylight, for the Nulla, near Chickop, a few miles north-east of Byl Hongul, and about twenty-five miles nearly due east of Belgaum. I was accompanied by a washer of goldsmiths' refuse, who had with him a circular shallow dish for washing the gravel.

Having arrived at a bend of the stream, circular sweepings were seen on the surface of the gravel, and these, I was informed, had been made by the gold-washers a few days previously. Trying some of the gravel here, the first basinful yielded two minute grains, fine gold, which, under the lens, appeared to have their angles much worn by attrition. After the washing process has been completed there remains behind a black iron sand, very much resembling fine-grained sporting gunpowder, and water being allowed to drop upon this, the yellow grains of gold come out prominently from the dark ground of iron sand.

Several trials were made near this with like success, a basinful of gravel containing in general one or two minute grains or scales.

Higher up, at the village of Moorhoombee, the stream bifurcates, and finding here a gold-washer and his son, who had that morning come from Moorgoor, a village near the source, I took them with me, and went up the right branch. The gravel here proved to be auriferous also. The following day I proceeded to a point a few miles higher up the branch; and reached the stream where the left bank was perpendicular, and about ten feet high, the opposite bank being formed by the gentle slope of a cotton field. Chlorite slate was here exposed, much disturbed and indurated Underlying the black soil, there was gravel and sand, and below that deposit, conglomerate limestone apparently rested on the chloride slate. The gravel in the bed of the stream contained gold.

The streams flowing through detritus occupying a depression between two parallel ridges composed of metamorphic rocks contained gold. Here the black soil had below it a bed of angular gravel, from two to five feet thick, and this rested on a decomposed felspathic rock.

With the exception of chlorite slate being here supplanted by red argillaceous schists and felspathic rocks, decomposed, the geological conditions were the same as at Byl Hongul.

At Dharwar I obtained information from Captain Wingate, which led me to change my route, and, instead of going by Purggurby to the northern districts of the Belgaum Collectorate, I proceeded *viâ* the Kupputgood Hills. [*Good* in the Canarese dialect means *gold.*]

I reached Dumul on the east side of the hills on the 4th July; and the weather being then very boisterous, I confined my operations to the vicinity of that village. Finding gold on the surface-gravel in the bed of the stream which flowed past Dumul (in Gudug Talook), I sunk a shaft in the gravel, in order to ascertain if the metal existed in greater proportion below, and in the interstices of the bed of the rock, which was here gneiss.

At the depth of seven feet, and before the rock had been gained, further progress was stopped by the flow of water, which could not be kept under by bailing. Gold in very small quantities was found at all depths, but not more below than immediately on the surface.

I made many trials in the streams which flowed into this main one, from both sides of the valley; but although there was abundance of black iron sand (which is often an indication of the presence of the more precious metal in auriferous districts), I did not succeed in finding a grain of gold.

On crossing the hills, however, by the Saltoor Pass, a more cheering prospect was in store. This pass lies between the principal range of the Kupputgood, and a system of hills to the north, forming a prolongation of the range. The rocks of the one differ in some degree from those of the other; thus, in the central and main range I met with no chlorite slate, while in the hills about Saltoor and Serhuttee it is the principal stratified rock.

The streams flowing from the west side of these hills (to the north) all contain gold. [This is a remarkable fact, in full agreement with what is observed in New South Wales.] They flow through a coarse angular gravel, which extends from the flanks of the hills for some distance into the plain, and underlies the black soil. At Saltoor I washed gold from the gravel of several of the streams; and at Serhuttee, wherever a flow of water through a field had carried away the soil and exposed the bed of gravel, there gold was to be met with.

I ascertained from the gold-washers settled at these villages that for the distance of ten or twelve miles, in a direction north and south, the streams are auriferous. But proceeding south, granite is seen rising in bosses through the soil. Here the gravel ceases to be auriferous.

[In Victoria, the auriferous quartz-veins are cut off by granite.]

At an interval of thirty or forty miles, gold again makes its appearance at Chin Moolgoond, and several streams in the neighbourhood, as I learned from Captain Wingate and some gold-washers who came from that quarter.

Returning to the east side of the hills I traced the Dumul stream to its source, and found it had its rise from the hills whose western side contained the auriferous gravel; and that it was not until the dip of the beds changed from east to west, and the underlying rocks were chlorite slate and talcose slate, that the streams joining it from both sides furnished gold. On a more extended acquaintance with the geology of the district, I thus discovered that my first operations at Dumul were undertaken at a point where the detritus was not auriferous, and where the small quantity of gold which was there found in the bed of the stream, had travelled down from the auriferous tract, among the hills of chlorite, slate, and trap. The red argillaceous schist and slate, which are the rocks covering the flanks of the main range, and which also enter into the composition of some of the outlying hills, are very similar to the rocks at Belowuddee; they are associates of the chlorite slate.

About five miles from Saltoor, on the top of a hill about 200 feet high, composed of this red schist, there are twenty-two pits of a circular form, from three to four feet in diameter, and from eighteen to twenty-five deep.

This hill has the name of Julgurgood (Gold Washer's Hill) in allusion, doubtless, to the supposed object for which these excavations were made; they did not appear to me to be of any great antiquity, but none of the natives from whom I made inquiry could tell me anything about them. Captain Newbold mentions some pits sunk by Tippoo in this part of the country for gun flints. These may be the excavations he refers to. Something must have been obtained from them, or so many would not have been sunk. The *débris* has been almost entirely removed. In the central range of the Kupputgood there are two hills, bearing the names of Great and Little Gold Mountains. I had only once an opportunity of being near the latter, while going through the Kupput Ischerura Pass. In a ravine which descended from this hill, quartz and iron ore were the only minerals visible (and gold is most frequently associated with these two). I had no gold-washer with me to try the gravel. A tradition exists among the people, that in by-gone days gold was *extracted from the rocks* by the process now adopted in the manufacture of iron—that is, by breaking the ore into small pieces, and powdering it, and smelting it in a small furnace.

It would have been satisfactory to have ascertained the proportion of gold to a ton of sand in the gravel on the west side of the Kupputgood hills; but I may here mention that I failed in my attempts to induce two or three coolies to enter my service before leaving Belgaum, and on getting into the districts no assistance could be obtained, there I found the people *are wholly engaged in the cultivation of the land, and will not take any other work.* [These words are thus marked in the original by the authority from whom it was received, and there is added by him "*a hint for* Australia."]

Again, the gold-washers gave their services with great reluctance, and were frequently absent when most particularly wanted. I was, from want of assistance, compelled to confine my experiments on the gravel to the determination of the fact that gold existed in certain localities. It would have been still more satisfactory to have detected the metal in the rocks, but it is no cause for despondency that it has not been detected, for in the great auriferous tracts of the world it rarely presents itself in the rock on the surface; and it was only after a much more continued search that I have made that it was discovered in the quartz of Australia.

In the Southern Mahratta country, the geological conditions necessary for the development of gold are present, and that the metal is extensively distributed over these districts is an established fact; but further researches, and those more particularly of a practical nature, must be undertaken before it can be determined whether a remunerative gold-field exists. As it is in the coarse angular gravel or local drift so abundant on the flanks of hills in a great many parts of the Belgaum and Tharwar collectorate that diggings should be made, the experiments should neither be costly nor difficult to undertake.

In the event of your concurring with me in thinking that this subject merits further investigation, I propose again proceeding to the basin of the Mulpurba, and taking with me the means necessary for prosecuting researches of a practical character, and to commence with the hills about Mongour, which I think a promising field.

On examining the progress of gold discovery in California and Australia, it will be found that, until diggings had been made, the highly auriferous character of the gravel was not apparent. In California, geologists had traversed ground and laid down the geological features of the country, without being aware of the fact that gold existed at all in the rocks; and in Australia, the first discoverer, Dr Clarke, was able merely to discover that the metal had been found by him in very small quantities.

It may be said, that even supposing nature had originally produced the metal here in great abundance, yet the fact of a dense population having been settled in the land from the earliest ages is against the probability of any large amount of the metal having been left in the ground.

If, however, this indeed is the veritable Ophir, an opinion at which Carl Ritter and other eminent men have arrived, I think we may reasonably doubt that the diggers of Solomon's time, or their descendants, could not have had so perfect a knowledge of the conditions in which the distribution of gold depends, to have completely exhausted a great gold-field.

Annexed to this, is a general description of the structure of the country, in which the gold is met with in the basin of the Mulpurba and Kupputgood Hills. I am, Sir, yours, &c.,

A. AYTOUN, Lieutenant Artillery, on special duty.

Belgaum District, August 1852.

This publication induced me to address to the Editor of the 'Empire' the following NINTH PUBLIC LETTER, which refers especially to THE GOLD FIELDS OF INDIA.

SIR,—The practical value of the discovery that surface-spread gold is conformable in shape to its bedding rock,—a discovery which influenced so materially the finding of the first alluvial gold in Australia,—and the utility of exposing the fallacy of the pulverization-hypothesis, advocated by Sir Roderick Murchison, a result of the knowledge of that fact never appeared more conspicuously than after perusal of official geological papers, like the report of Lieut. Aytoun upon gold in India, published in the 'Herald' of the 23rd instant.

To my view, India at the present time stands in the same light that Australia did in 1850, except that much more is now known about the phenomena of gold deposits than any person knew at that time, and with this difference, that India may possibly have been dug out in ancient times, while Australia, it was clear, could not have been previously worked.

It is a question of the deepest historical interest, and of vast importance, as to the possibility of the inquiry producing an augmentation of national wealth, to determine whether or no the gold-fields of Hindustan were worked out in ancient times. The fact of the existence of gold on the continent of India has been known to Europeans from an early date, and the knowledge repeatedly revived by the testimony of eye-witnesses during its British occupation, and again, lately by the geological examinations of Lieut. Aytoun; but he, like most explorers, confiding in the authority of Murchison, just detects the presence of gold in alluvia, and then needlessly laments that the rocks cannot be found from which he fancies it ought to have been disintegrated; the possibility of any other origin never seems to occur.

The Rev. W. B. Clarke, guided by geological considerations, lately pointed out some parts of India as being of auriferous promise. The interior of India, in the opinion of Humboldt, is not indicative of great auriferous wealth. Scientific knowledge of the conditions under which gold exists, it must be admitted, is considerably advanced since the time when Humboldt wrote, and as the former authority had the advantage of anticipating Sir R. Murchison by several years, in arriving at those conclusions commonly called the indications of geology (which intimated that the axes, parallels, and flanks of the mountain trends in Australia, were favourable auriferous conditions), none can, perhaps, form a better estimate of the value of the geological indications of Hindustan.

But admitting the excellence of the geological indications in the Mahratta country, the inquiry still remains unsatisfied as to the extent to which the gold-fields have been worked at a date so distant, that a previous disturbance of the soil by human hands would now be difficult to detect: the most experienced diggers would probably be puzzled to judge by ocular examination. The more apparent it becomes that there exists in India the geological conditions necessary for a large development of gold, the more probable it seems to be that Western India is the veritable Ophir worked in the days of King Solomon.

"Whatever doubt may exist," observes Humboldt, in Cosmos, "regarding the localization of the distant gold-lands (Ophir and Supara), and whether these gold-lands are the *western coasts of the Indian Peninsula*, or the eastern shores of Africa, it is at any rate certain that this active, enterprising Semitic race (the Phœnicians) had a direct acquaintance with the products of the most different climates, from the Cassiterides to the south of the Straits of Bab-el-Mandeb far within the tropics. The Tyrian flag floated simultaneously in the British and Indian seas.

"The expeditions sent by Hiram and Solomon, and which were undertaken conjointly by Tyrians and Israelites, sailed from Ezion Geber through the Straits of Bab-el-Mandeb to Ophir (Opheir, Sophir, Sophara, the Sanscrit Supara of Ptolemy). Solomon, who loved pomp, caused a fleet to be constructed at the Red Sea, and Hiram supplied him with experienced Phœnician seamen and Tyrian vessels ('ships of Tarshish'). The articles of commerce which were brought from Ophir were gold, silver, sandal-wood (*algummin*), precious stones, ivory, apes (*kophim*), and peacocks (*thukkum*). *These are not Hebrew but Indian names.* It would appear highly probable, from the careful investigations of Genesius, Benfey, and Lassen, that the Phœnicians *must have visited the western coasts of the Indian Peninsula.* Christopher Columbus was even persuaded that Ophir (the El Dorado of Solomon) and Mount Sopara were a portion of Eastern Asia, the *Chersonesus Aurea* of Ptolemy. *As it appears difficult to form an idea of Western India as a fruitful source of gold*, it will, I think, scarcely be necessary to refer to the 'gold-seeking ants,' it being sufficient to direct attention to the geographical proximity of Southern Arabia, of the Island of Dioscorides (the Diu Zokotara of the moderns), cultivated by Indian colonists, and to the auriferous coast of Sofala in Eastern

Africa, Arabia, and the islands last referred to, to the south-east of the Straits of Bab-el-Mandeb, may be regarded as affording intermediate links of connection between the India Peninsula and Eastern Africa, for the combined commerce of the Hebrews and Phœnicians. The Indians had, from the earliest time, made settlements in the eastern part of Africa, and on the coasts immediately opposite their native country; and the traders of Ophir might have found in the basin of the Erythreian and Indian Seas, other sources of gold besides India itself."

In Whiston's translation of Josephus's 'Antiquities of the Jews,' it is, however, thus worded, concerning certain ports in the Red Sea.

"Hiram, King of Tyre, sent a sufficient number of men thither for pilots, and such as were skilful in navigation, to whom Solomon gave this command; that they should go along with his own stewards to the land that was of old called Ophir, but now the Aurea Chersonesus which belongs to India, to fetch him gold, and when they had gathered four hundred talents together, they returned to the king again (a talent of gold, the translator estimates to have been of the value of 648*l.*)"

It would appear from this passage to be quite probable that Ophir really was either the southern extremity of modern Hindustan (India proper being in those days confined to the northern provinces), or else Ophir was the more eastern portion of India, which, under the modern names of the Malayan Peninsula, the Island of Sumatra, &c., is supposed by most, if not all learned authorities, to have been the "Aurea Chersonesus" of the ancients. Wherever the locality of Ophir "belonging to India" may have been, the affirmation of Josephus appears positive as to Ophir and the Aurea Chersonesus being one and the same place.

Now, since the Rev. W. B. Clarke, by scientific deduction, and Lieutenant Aytoun, by actual examination, both find the geological conditions of India to be so favourable for gold, and since its existence in greater or less quantities over large areas in that quarter has been long known, and again proved, why did Humboldt find it so difficult to form an idea of Western India as a fruitful source of gold and labour as above to prove that the gold of Ophir came from elsewhere?

In R. M. Martin's 'British Colonies,' it is stated of India,—

"Gold is found in the beds of most (Indian) rivers, particularly in the Neilgherries; but it exists in abundance in the state of ore in Malabar. This precious metal has been discovered not only in Coimbatore, but throughout that tract of the country lying west and south of the Neilgherry mountains and Koondanad. It is found here in great quantities. The whole of the country west of the Neilgherry mountains in the taloogs of Parakameetil, especially at Nelliala, Cherangote, Koonyote, Kotah, Nambolakotab, &c., &c., also the adjoining Koondanad and Ghaut mountains, and all the rivers and cholas (water-courses) down as far west as Nellambore, and south-west as Caladicota, Karimpure, Aliparamba, &c., the whole tract, including the mountains, perhaps comprising 2,000 square miles, is impregnated with gold. Even the very stones in the beds of rivers, when pounded, have been found to contain particles of that valuable metal. It is found in solid pieces, but generally it is in extremely small particles, obtained in washing the sand of all the rivers as far as Nellambore, Karimpure, &c., as well as in the soil. Gold dust is procured in considerable quantities in every river in the Bhot Mehals of Kumaou, and is abundant in the multitude of rivers and streams in Assam. According to native statements there is a valuable gold mine called Pakerguri, at the junction of the Dousiri, or Douhiri river, with the Brahmaputra, about thirty-two miles from Gohati. In 1809 it was estimated that 1,000 men were employed in collecting gold, and that the State annually received 1,500 rupees' weight in gold. There can be no doubt that when the riches of India begin to be appreciated in England, the precious metals will flow in abundance from the eastern to the western hemispheres."

So says Mr R. Montgomery Martin.

The same general information is to be found in the 'Encyclopædia Britannica,' article 'Hindustan,' together with an account of the native iron works, which may perhaps have a bearing on the tradition said to exist that gold was formerly obtained in India by smelting and metallurgical treatment. The writer observes:

"From the wild and inaccessible nature of the country in many parts of Hindustan its metallic products are but imperfectly known. Gold is generally found in the sands of the mountain streams, and is extracted by washing. The head streams of the Ganges bring along with them particles of gold which in Rohilcund are collected by a particular caste of people. It is found in various parts of Mysore, particularly nine miles east of Boodicotta, where the country is impregnated with it; also in the Neilgherry mountains, and in great quantities in all that tract of country that lies west, and in the adjoining Koondanad and Ghaut mountains. Unrefined gold is regularly exchanged by many of the mountain tribes of the north for the produce of the plains. The granitic mountains of Nepaul and Northern Hindustan contain much iron, lead, and copper, with a little gold in the river-courses. . . . The Mysore country abounds in iron, and forges are erected by which it is extracted from the black sand which is found during the rainy season in the Cavery or its tributary streams, and partly from ores. . . . In Coimbetore and in Malabar the iron mines give employment to a considerable number of persons. The process and machinery for extracting the iron are very imperfect."

The greater part of both the foregoing quotations, as far as relates to the Malabar and Canara declivity of the Western Ghauts, appears from the language employed to rest upon the authority of the evidence of Thomas Harvey Baber, taken before the House of Lords, on the 2nd April, 1830, a copy of which now lies before me. The following selections have much interest:

3137. Had any gold been found before you left?—Yes, not only in Coimbatore, but through that tract of country lying west and south of the Neilgherry mountains and Koondanad. I have often seen the whole process and have purchased gold extracted before me.

3138. Is it found there in any quantities?—Yes, the whole of the country west of the Neilgherry mountains in the taloogs of Parakameetil, especially at Mellala, &c., the whole tract including the mountains, perhaps comprising 2,000 miles square, I may say is impregnated with gold.

3139. Do you know if any considerable quantity has yet been brought from that country or in large pieces?—I have seen pieces weighing perhaps half a guinea, solid pieces, but generally it is in extremely small particles.

3140. Is it found in washing the sand of the rivers?—Yes, in all the rivers, as far as Nellambore, &c., as well as in the soil.

3141. Is the right of searching for it confined to the Government or to the proprietors of the land?—To the proprietors of the mountains and places where it is found, which are equally private property as the low lands.

3143. How long has it been known to be produced in this river?—As long as we have known anything of Malabar.

3144. How does it happen, if it is so abundant, that it has never been sought for on a larger scale?—Because the land belongs to individuals who are exceedingly jealous, and will allow no persons but themselves to dig for it.

3146. Would it require capital to carry on the process?—Some capital, certainly; but unfortunately that part of the country is so very unhealthy that few strangers could stand the climate.

3147. Is there any gold in the Neilgherry mountains?—Some was brought to me from about half-way up the Western hills, by the Koties, potters, and basket-makers.

3148. The climate of the Neilgherry hills is very good, is it not?—It is, perhaps, the finest in the world. The thermometer ranged about 50 to 55 during the time I was there.

3149. Have agents of the Company ever been instituted, to make an attempt to establish a more extensive search for it?—Never. The Government derive a revenue from the pattees or lays in which the gold is washed. Each pattee pays so much per annum.

3150. Have you any notion of the quantity which has been found; is there any account of that?—No, I have not; and the people themselves are very averse to give any information. They naturally suppose that our object in all inquiries of this kind is to raise our demands upon them.

3154. Are there any mines in Malabar?—Those are the only mines I am aware of. They dig sometimes very deep; but, from want of machinery, they have no means of going on; not being able to prop up the superincumbent ground.

3155. Have they ever found this gold in large masses?—The deeper they go the larger the particles are generally.

3156. Have they ever pursued any vein of it?—No.

3157. Would the proprietors of land be indisposed to let their lands for the purpose of permitting the gold to be got?—They would be very glad to sell their lands.

3158. Would they be glad to sell it at such a reasonable price as would make it worth the while of persons of capital to take it?—I am sure they would.

3162. Have the Company endeavoured to search for it on their own account?—Never that I know of.

3163. Was it part of your duty to suggest to them things of that kind when you were there?—I think I did write on that subject to my superiors when I was in charge of Wynoud, in 1805 or 1806; but I was a subordinate officer at that time. I think my suggestion was to have some scientific person sent out to explore that part of the country.

3164. Was anything done upon that?—No.

3165. You are not aware that the Company have taken any steps to see whether they can increase the production?—I am certain they have not.

3166. Do you think they have been prevented by the extreme jealousy of the people on the subject?—I rather think the Government have never turned their minds to the subject, the income derived is so trifling; it was not, perhaps, of sufficient importance.

The foregoing testimony needs no comment to prove that the great extent of auriferous land within the Madras Presidency has been long known; the supineness of the local Government on the subject is equally apparent, as well as the incompetency of inexperienced persons to judge correctly of the value of the indications that come under their notice. Mr Baber's account of Indian land tenures and mining rights is confused, and not in accordance with the peculiar institutions of our Eastern possessions; still he, perhaps, appreciated the operation of local customs and usages better than more formal authorities. Lieutenant Aytoun's Report is suggestive of many important considerations; he, too, finds the natives give their services with reluctance, and not having had great practical experience himself, he has, perhaps, been often wilfully misled in seeking the richer localities; and the coloured residents being so devoted to agricultural pursuits that they will not, as the explorer states, dig for gold even when aware of its presence, they cannot be expected to know much about the matter; the simple natives might, in fact, be living all the while upon an Indian Balaarat.

It is certainly no cause for despondency that Lieutenant Aytoun finds none of the precious metal in white quartz—the notion of the superior gold-producing importance of quartz-mining over the diggings in alluvia disturbs whole communities from time to time like an epidemic, and results from Sir Roderick Murchison's erroneous hypothesis respecting the origin of alluvial gold deposits. California, New South Wales, and Victoria, each, in turn, takes the fever, and interested parties purposely increase the disorder.

The tradition alluded to by Lieutenant Aytoun as now existing among the people of India, that in by-gone days gold was *extracted from the rocks* by the process now adopted in the manufacture of iron, that is, by smelting in a small furnace, obtains other support from ancient authorities, and in a private communication I have from a correspondent long resident at the celebrated Gongo Soco mine in Brazil, twenty-five years ago, strong hopes are expressed that the Indian ores are of the same ferruginous kind; the tradition seems to encourage those hopes—the gold in the Brazilian mine, he says, "is in an ore of manganese and black oxide of iron, and it is strange that the remarkable class of mines of which Gongo Soco has proved such a wonderful instance, should have escaped the miners of both Australia and California. My experience," he continues, "has shown me that mining for gold in quartz-veins is a delusion and a snare." He refers, I presume, more to the doubtful permanency of auriferous white quartz in depth, quantity, and quality—conditions so essential for remunerating the systematic mining of incorporated companies of absentee capitalists—than to the profitable quarrying of auriferous quartz by resident proprietary operators, and he intimates it as his opinion that, where gold is extracted from the rocks by amalgamating or reducing processes, an abundance of iron or other base metal is the only favourable condition for a lasting supply of the more precious metal. Tradition, history, South American experience, and recent examination, all favour the hope that compound auriferous ores of available quality exist in Hindustan, as well as alluvial gold deposits;—India is doubtless rich in gold-fields, provided that they have not been already dug out. I am, Sir, &c.,

Sydney, August 29, 1855. SIMPSON DAVISON.

The Rev. Mr Clarke, immediately after the previous letter, forwarded to the Editor of the 'Herald' some further extracts with comments, from Lieut. Aytoun's geological reports, and thus prefaced his remarks on GOLD IN INDIA.

SIR,—In continuation of the subject which I lately introduced to your readers, I now trouble you with an abstract of Lieutenant Aytoun's Geological Report on the Belgaum Collectorate.

A writer in your daily contemporary has quoted largely on the general existence of gold in India, from certain popular works, and from some evidence in his possession, relating to gold in another part of India; but the district in which I suggested the existence of gold, and the survey of which Lieutenant Aytoun's reports refer to, is distinct from them, being in about 16° N. It is well to remember this, because it is, undoubtedly, a general vague impression that gold exists *all over India;* but there are very few spots in which its actual presence has yet been recorded on good data. Humboldt's views on the subject are entitled to the most respectful attention; nevertheless, I do not admit Ritter's supposition that the veritable Ophir was where he has provisionally placed it. To those who are aware of the importance, in a physical sense, of close comparison of the geological structures of countries so wide apart as Hindustan and Australia, no apology will be needed for intruding upon their notice the scientific observations of Lieutenant Aytoun. W. B. C.

5th Sept., 1855.

(The extracts are re-printed in Appendix C.)

Since my return to England, by personal interview with the correspondent named in my last public letter, and by examination of the specimens of gold in matrix from Gongo Soco, I am enabled to say that in no part of Australia or California which I have visited has any matrix at all approaching it in appearance yet been discovered. It is described on the labels at the Museums as " micaceous iron." I am further informed that this black matrix occurs as a veinstone, and not as an horizontal deposit. It is obvious that, in order to hazard any opinion on the theory of its formation, the physical conditions of the matrix ought to be studied in nature; nevertheless, I presume that the black iron matrix may be in fact an igneous rock, and that by some peculiarity in the condition of its cooling a micaceous structure has been imparted to it by some imperfectly understood law of crystallization, or possibly an igneous agent may really have charged a stratified rock with visible gold. However that may be, the immense yield of the single mine of Gongo Soco, which has produced altogether gold over the value of TWO MILLIONS OF POUNDS STERLING, and the different character of the matrix (the metal in it being visible in extremely small particles) from any known veinstones or ores in Australia, again confirms how necessary it is that a practical experience, combined with the *comparison of many gold mines*, should be the qualifications of every gold explorer rather than implicit faith in the errors and abstractions in which men of science have so much indulged. In many auriferous quartz-veins the abundance of iron continues to be regarded as a favourable indication of permanency in yielding gold; and in connexion with the subject of the association of gold with iron, I may relate an episode in my own experience, which at a future time may perhaps be better recognised as one of public importance. Near to my sheep station of Goodgood (which adjoins Jingerry), in a mountainous and little-known locality, I had formerly observed a large outcrop of very rich iron ore—at least a thousand tons in one continuous vein appearing above ground; and when the Fitz Roy iron mines near Berrima were attracting much public notice, I visited them on one occasion in my journey to Sydney, and perceived at once that the iron ore near my station was of a precisely similar kind, quite equal in quality and quite as abundant in quantity. In California I had frequently spoken to Mr Hargraves of this vein of iron ore, not however as being associated with visible gold, because we had not witnessed in California the association of visible gold with any iron ore of this kind. On my return to the colony I found that Mr Hargraves had, when employed by the Government in gold exploration, visited and obtained a specimen from this vein of iron ore which I had described to him, without, however, either finding, or expecting to find, any visible gold connected with it. Shortly after learning Mr Hargraves had visited it, I found one of the Rev. Mr Clarke's official reports, in which, without his having seen this particular vein, which is largely developed, he had submitted to analysis similar iron ores from the same district, including one from the identical veinstone, and reported the existence in them of considerable gold in an *invisible state.* Under these circumstances I applied to the Government respecting the vein of iron ore which I had so long known, to ascertain whether I could obtain the right to work it, either *by purchase or by lease without competition*, for it did not appear to me just that a discoverer should enter into equal competition with the public, and gratuitously give information for the sole benefit of money-capitalists. It will scarcely be credited that at this advanced stage of colonial existence, and when the public were clamorous for development of the mineral resources of the colony, there should exist no Government regulations whatever to facilitate the working of the metallic veins of this kind. The subjoined extracts and reply to my inquiry will show this to have been the case, and I may here add that the registered application yet remains in abeyance.

Extract from Mr HARGRAVES'S REPORT to the COLONIAL SECRETARY, dated Jineroo, Braidwood, 20th October, 1851.

"I have brought a specimen of ironstone from the Jingerry mountains, which I believe contains gold, and have given it to Mr Clarke, who has the means of testing it, and will communicate the result to you."

Then, in the next Report, dated 24th October, 1851, the Rev. Mr Clarke observes:

"The occurrence of auriferous ironstone in the limestone of the gullies near Marulan—in the limestone of Wianbene—and as I learn from a specimen brought by Mr Hargraves from the vicinity of limestone near Jingerry,—is not without its significance. It extends our views of the gold question."

Soon afterwards the following special Report appeared:

Copy of a Letter from the Rev. W. B. CLARKE to the COLONIAL SECRETARY, respecting AURIFEROUS IRONSTONES in the SOUTHERN DISTRICTS.

Bulunamang, 15th November, 1851.

SIR,—In my last communication respecting the existence of gold on Molonglo River, &c., I mentioned that the slates and quartzites of the Merriwa and Lake George Ranges did not appear to be auriferous.

I have now the honour of stating, for the information of his Excellency the Governor-General, that although when subjected to chemical analysis the quartz running through the slates yielded no gold, yet the ironstone intimately associated with that quartz (the specimens were taken from the summit of the range a little south of the Stony Creek) is auriferous, half a grain of gold having been produced by amalgamation and the retort, from four ounces of the ironstone.

The official reply to my application for lease of the iron mine, which I had in California pointed out to Mr Hargraves, is as follows :

Colonial Secretary's Office, Sydney, 31st December, 1853.

SIR,—I have the honour to acknowledge the receipt of your letter of the 22nd instant, inquiring whether you will be allowed a lease of certain land containing iron ore, and to inform you in reply, by the direction of his Excellency the Governor-General, that it is the intention of the Government to apply for an Order in Council to meet cases of this kind. At present there is no regulation which would allow of the land being either purchased or leased for the purpose in question without being submitted to competition.

I have the honour to be, Sir,
Your most obedient servant, for the Colonial Secretary,
S. Davison, Esq., Sydney. W. ELYARD.

Part Eighth.

AN HISTORICAL PARALLEL.

THE extravagant paragraphs which appeared from time to time in the local newspapers, relating to Mr Hargraves, were highly amusing to those fully informed of the true circumstances of the gold discovery; since intentions were therein often attributed to him which he had never entertained, and acts frequently ascribed to him which he had never performed. Some of these inordinate panegyrics astonished nobody more than Mr Hargraves himself, who was amazed to read such grandiloquent accounts of his own performances. However, like eastern monarchs who listen to the flatteries of their slaves until they believe them, Mr Hargraves was at length beguiled into accepting much of the adulation which placed him on an equal footing with Columbus and other historical celebrities, and at length, in one of his public letters, drew a parallel between the discovery of America by Columbus and the gold discovery. During the time Mr Hargraves was in England, one of the provincial papers there, being, I suppose, set in motion by him, also indulged in equal extravagancies. The following letter of an anterior date, and a review from the 'Leader,' of the book which Mr Hargraves published in England, are both specimens of the literature to which I allude, and which provoked from me the next public letter of a satirical character.

It is necessary here to say a few words of an individual whom I have mentioned incidentally more than once, I mean John Calvert. Some imagine there are several persons of the same name, or otherwise, that the name has been assumed as an ideal authority for everything connected with fabulous gold discoveries. A person of this name followed the steps of the Rev. Mr Clarke, while upon a geological survey in New South Wales; then one of the same name opened a geological and mineral survey office in Sydney, for the purpose of giving advice to individuals or companies on the subject of gold-mining, according to a scale of fees which were established; next, a person of the same name appeared in London, where he opened a similar office, and lastly, published a pamphlet on the 'Gold-fields in England,' besides reading a paper on the subject of Australian gold-rocks, before the British Association. In the meantime the most incredible accounts appeared in the local papers, in which John Calvert is represented as having carried gold away by the hundred-weight, from the gold-bearing quartz-veins of New South Wales, one of these veins was stated in England to be popularly known in the colony as "Calvert's Bank;" certificates were also given by him in London, relating to the efficiency of Berdan's quartz-crushing machines, and altogether the performances, if true, were calculated to throw all other gold discoverers entirely into the shade. Besides the annexed review of 'Australia and its Gold-fields,' and the letter from Mr Hargraves, in both of which Mr Hargraves's services are compared with those of Columbus, there appeared another extravagant article in a Nottingham newspaper, full of misrepresentations, and what gave the article especial piquancy is the fact that many of the statements which were totally false as related to Mr Hargraves were perfectly true of myself, of whom the Nottingham editor had probably never heard a single word (for instance, the false allegation of Mr Hargraves having left in Australia his sheep runs, now estimated at 50,000*l.*); and to make the matter yet more extraordinary, it appeared, from the circumstances of its publication, as if it had proceeded directly from the verbal statements made in the editor's office by Mr Hargraves himself.

The three subjoined papers are those referred to, the first being from the 'Leader,' dated London, 3rd February, 1855, as a REVIEW of—

AUSTRALIA AND ITS GOLD-FIELDS: AN HISTORICAL SKETCH OF THE PROGRESS OF THE AUSTRALIAN COLONIES, FROM THE EARLIEST TIMES TO THE PRESENT DAY; WITH A PARTICULAR ACCOUNT OF THE RECENT GOLD DISCOVERIES, &c. By Edward Hammond Hargraves.

The destinies of nations have been changed by individuals more frequently and more entirely than by any progressive development of their own physical or intellectual resources. Consider the effects produced on the world by the lives of Alexander, Cæsar, Charlemagne, Peter the Hermit, Columbus, Napoleon! The list might be increased from the ranks of kings and conquerors, discoverers, and men of science. We may, at all events, venture to add one name to it—that of Edward Hammond Hargraves, the first discoverer of gold in Australia. Reflecting for an instant on the condition of that country a few years ago — a wool-growing, cattle-breeding colony, useful in providing food to men who found it difficult to procure a livelihood elsewhere, but utterly insignificant in its relation to the rest of the world—and comparing that condition with its present state as the richest mineral country of the world, the country which exported more than fifty millions sterling of gold in the space of three years—we think that the man whose discovery produced this vast and unparalleled change deserves to rank among the few whose lives have given new destinies to nations.

In the volume before us Mr Hargraves has given us a faint sketch —the very faintest—of his own history. We could have wished it more explicit and complete, not from personal curiosity to know more about a man who has made the greatest discovery of modern times, but because there is enough in the outline he has furnished, to show that his life has been one of struggle and hardship, difficulties overcome by patience and perseverance, and the evils of early poverty and defective education, counteracted by strong principle and indomitable self-reliance. We cannot have too many or too copious—so long as they are simple—biographies of such men, the true heroes to whom popular worship should be addressed in preference to men of the sword and sceptre. He was an Australian settler at the age of seventeen; before eighteen he was a "squatter," with cows and bullocks of his own, and a married man; at nineteen he was a father.

The news of the discovery of gold in California, in the autumn of 1848, reached New South Wales in January, 1849. It was at first received with doubt; but the arrival of a ship shortly afterwards with a quantity of the precious metal on board silenced incredulity. Then the same effect followed as was produced in England. The *auri sacra fames* induced hundreds or thousands of peaceful colonists to abandon home and property, friends and family, and rush off to Western America, in the hopes of returning in a few months laden with fabulous wealth. This was the more natural from the fact that Australia had for some years been in a languishing condition.

Mr Hargraves was one of those bitten with the gold mania, and was one of the first Australian colonists who quitted the land of the south for California. He was not very successful in his new enterprise. He arrived just as the rainy season set in; had some difficulty in procuring a waggon to convey him to "the diggings;" was cheated and deserted by the driver he had engaged; fixed on an unfavourable spot for his first essays, and if afterwards rather more fortunate in this respect, never, it appears, earned enough to barely repay the hardship and misery of the life he led in a winter from whose severity people were dying all around him, while he jumped up nightly from his bed of pine-branches laid on slates, to knock the snow off his tent, lest its own weight should break through the canvas. He had, however, gained much from his visit to the gold-mines of California. We must here give his own words:

"But far more important thoughts than those of present success or failure were, from the very first, growing up in my mind, and gradually assuming a body and a shape. My attention was naturally drawn to the form and geological structure of the surrounding country, and it soon struck me that I had, some eighteen years before, travelled through a country very similar to the one I was now in, in New South Wales. I said to myself, there are the same class of rocks, slates, quartz, granite, red-soil, and everything else that appears necessary to constitute a gold-field. So convinced did I become of the similarity of the two countries, that I mentioned my persuasion to my friend Davison, and expressed my belief that we should soon hear of a discovery of gold in that country, and my determination, if it was not discovered before my return to New South Wales, to prosecute a systematic search for it. Of my companions, some laughed at me, and others reasoned against my theory."

But ridicule, most powerful against weak minds, seldom deters a strong one from following its own bent; while reason is almost thrown away against those convictions which are either fanatical or inspired, as they prove to be false or correct. Mr Hargraves left California to search for gold in New South Wales. He landed in Sydney in January, 1851, started at once across the Blue Mountains to the spot he had "marked down" in his mind's eye, got a boy to guide him to the creek where there was water to be found, dug up a piece of the soil into a tin pan, washed it, and *found the gold*. One or two more experiments made with the same result, he was satisfied with his discovery, rode back to Sydney, announced the great tidings to the Colonial Government, and demanded his reward. The usual official caution was, of course, manifested by the local powers; but eventually Mr Hargraves was authorized to pursue his discoveries, being made a Commissioner of Crown lands, at the tremendous salary of 20*s*. a-day. Eventually, when the truth of his statements had been verified, and he had practically demonstrated the existence of countless wealth in the Australian soil, the Legislative Council of New South Wales voted him 10,000*l*. as his reward—"deducting, by way of discount," he says, "the 500*l*. I first received"—to enable him to pay the current expenses of his explorations.

Such is the history of the discovery of gold in Australia. Mr Hargraves, however, states candidly that Sir Roderick Murchison had, seven or eight years earlier, proclaimed the fact that gold would be found in the colony—founding his opinion on a careful examination of the geological specimens of the country forwarded to him by Count Strzelecki, and comparing them with those of the Ural, which he had himself visited. But Mr Hargraves knew nothing of geology, or any other science, and had never even heard of Sir Roderick Murchison. Such is fame. Would Sir Roderick have believed that there existed a civilised being, much more a countryman of his own, who had never heard his name, and would not have known whether he was a court physician, the new lord mayor, or a country gentleman of the protectionist interest?

The book which Mr Hargraves has presented to the world is a curious medley. We have a history of Australia in five-and-twenty pages, and a history of gold-mines, tedious to read, in forty-two more. Then follow two really interesting chapters, containing an account of the author's own adventures in California and Australia. A fifth chapter is devoted to an account of the various methods of working for gold, ancient and modern, the greater part of which is useless, and almost out of place in a work which claims to be both practical and unpretending. And then follows a sixth chapter on the land question in Australia—that *vexata quæstio* which is still puzzling the brains of the colonists, and would infallibly confuse those of most of our readers. As far as we can see, the present rule of having a fixed upset price for all land is the most vicious part of the system in force.

Mr Hargraves has added to his own work two letters from his friend Mr Simpson Davison on the origin of gold. Like all theories which cannot be brought to the test of actual proof, it has a number of objections to it which cannot be easily got rid of. Still it is ingenious, and at least as good as any other on the subject. It is 'that alluvial gold has been disintegrated and deposited by means of a perishable lava; and that the quartz-veins, as well as some other dykes traversing constants, have been the fissures of discharge, the only remains of the decomposed lava being gold, quartz, and a few other minerals, with clays and ferruginous earths.' Those of our readers who are scientific enough to relish the subject will find this theory well discussed and advocated by Mr Davison.

The second paper is a leader from the 'Guardian' newspaper of Nottingham, in England, reproduced in one of the colonial journals in Feb. 1855. Mr Hargraves here seems to have succeeded in giving the Nottingham Editor to understand that "placer deposit gold is moulded in shape to the bed-rock" much more clearly than is stated anywhere in the book which he published about the same time, or in any of his previous official Reports. Perhaps an explanation of this difference may be found in the circumstance of his having my THIRD public letter then in possession as well as my verbal explanations of the theory with which I had lately charged him, while the book on 'Australia and its Gold-fields' had been sent from Sydney, ready compiled, by an eminent literary person, very shortly after my two first public letters addressed to him had been published. The article appeared under the heading, MR HARGRAVES, THE ORIGINAL GOLD DISCOVERER.

On Monday we had the pleasure of seeing, at the 'Guardian' office, and spending an hour or two in conversation with, a man henceforth to be held illustrious amongst the names destined to distinguish the nineteenth century—Mr Hargraves, who, not by scientific divination, but by the efficient aid of practical experience in California, and an innate sagacity, such as Chatham boasted to be the distinguishing characteristic of Cromwell, has undoubtedly redoubled the wealth and resources of his era by the discovery of the unparalleled auriferous deposits of our Australian possessions. Mr Hargraves, who has been spending a few days in Nottingham, on a visit at the house of Mr and Mrs Bishop, is a tall, stout, well-made man, with a frank, open expression of countenance, a fine mild blue eye, and, notwithstanding the jet black of his moustache and imperiale (worn *à la Australien*), of quite a florid complexion; altogether the gold discoverer is a noble specimen of the colonist and, if you will, of the gold-miner. Mr Hargraves was kind enough to bring with him many and varied specimens of his gold "nuggets," regretting, however, that before he became aware of the interest which these treasures in their natural state are calculated to excite "at home," he had melted down a large number of perhaps the most interesting. Having imparted to us, with an easy, perspicuous agreeability of manner which is peculiar to him, and which we found to constitute a vehicle for conveying in a wonderfully brief and appreciable manner a very rapid succession of information (a strong attestation of the discoverer's superior intelligence), his views on the subject of the gold formations, we are enabled to state that Mr Hargraves differs strongly from the theories of many, indeed of most of our geologists, including even Sir Roderick Murchison and his disciples, and more especially the Rev. Mr Clarke, whose ability to explain his own romantic notions of the generation of gold by volcanic action and the agency of steam, he seems to regard as quite conclusive against them, whilst he cannot see why quartz should be peculiarly denominated the matrix of gold. Both he conceives to have been formed at the same time, one in a gaseous form, the other in a state of metallic fusion; and being so formed, they have in some instances happened to adhere to each other on solidification or crystallization, but without possessing any necessary affinity for each other. The bed-rock of the country is, however, the site of the great majority of gold deposits; and the specimens exhibited to us by Mr Hargraves (the largest whereof weighed 2lbs.), and was of the value of 100*l.*, although from the ponderosity of the metal it only measured a few inches each way, and was besides honey-combed like a cinder, small portions of embedded quartz being perceptible among its interstices, bore the most conclusive marks of fusion, and of that sudden cooling as if by immersion, with which every one is familiar in the process of dropping molten lead into water. Some of the specimens (and very beautiful these were) were pear-shaped and perfectly solid; suspended by the narrow point, like the weight of a pendulum, the remarkable ponderosity of the metal was most obvious, whilst the colour in two of these pear-shaped nodules was a magnificent yellow. In others of Mr Hargraves's specimens the molten gold had settled upon the rugged rock surface as on a mould, and came off in the form of a scale or crust of tolerable thickness, but indented with all the inequalities of its mould. In these cases the colour of the gold was much more ruddy than in the more solid masses, exhibiting a porphyritic tendency, which was highly marked; in one piece a commingled gold and quartz, where the stone had become quite ruby, although the quartz crystals embedded amongst larger masses of gold were frequently pure white, and in one instance we noticed so embedded an example of one of these six-sided crystals which Professor Edward Forbes in his 'Gold Lecture' guards discoverers against mistaking for the diamond. Mr Hargraves, we may mention, has no faith in the discovery of gems in Australia; but he is highly impressed as ever with the illimitable development of his own gold discoveries, stating it as his conviction that the gold-fields occupy the entire backbone of that vast region, and pointing to the discovery of new diggings day after day in the immediate vicinity of the spots on which the first discoveries were effected, to the continuous large transmissions by escort, and to the fact that already fifty millions sterling have been added to the world's wealth as the fruits of this grand discovery. With Mr Hargraves's story we dare say most of our readers are familiar. Originally a stockholder in the vicinity of Melbourne, he sold out, and went to California. Scarcely had he commenced operations in that country than the similarity of the schistose formations with those of the district he had quitted pressed strongly on his observation. "These," he said, "are precisely the rocks with which we are familiar in Australia." Satisfied at length of their identity, he wrote to the Colonial Government, proposing to point out the Australian gold-fields, of which they were already in search. The consequence was that on returning to Australia he did discover the gold, and simply stipulating with Government that he should be rewarded commensurately with the importance of the discovery, he actually put the official geologist, Mr Stutchbury, in possession of the ground.

Mr Hargraves has not been rewarded commensurately with the importance of the discovery; and although it is with the greatest good humour that he makes the remark, that the 10,000*l*. or 20,000*l*. bestowed upon him the discoverer, might have been made 50,000*l*. had he remained on his sheep runs to enjoy the effect of some other person's discovery of gold upon the prosperity of the colony, as actually happened to his contemporaries; or again, that fifty of the persons who came home in the ship with him were found to have been rendered richer by the fruit of his discoveries than he had been himself. Then, large as Mr Hargraves's reward may seem, it is certainly not an equivalent for what he has done; neither has the mode of conferring it been altogether graceful. The Governor-General, in the first instance, imagined he could waive Mr Hargraves's claim entirely by the paltry Government appointment of Commissioner of Crown Lands, at 1*l*. a-day—a sum which, with his resources, and the capital of his friends, the gold discoverer could have as easily put himself in the way of clearing every hour. 5,000*l*. were then proffered, and as our readers may remember, rejected by Mr Hargraves; and at length a vote of 10,000*l*. was carried in the Legislature of New South Wales, by a very large majority, thirty of the members voting for 10,000*l*. and five for 5,000*l*. reward. It may, however, be also recollected that at the period of the memorable discovery, Mr Hargraves found the colony of Victoria included under that of New South Wales; but having now become a separate colony, and one which had chiefly benefited by the gold discoveries, another vote of 10,000*l*. is presently passing the Legislature of Victoria in Mr Hargraves's favour. This is independently of the gold cups and presentations awarded him in a more private manner, which will no doubt be followed up in the home country by substantial tokens and acknowledgments of two things undeniably done for us by the golden spell of these discoveries—snatching us in the first place from the brink of one of the most awful crises on which our social organism ever verged, and stimulating in the next our trade to a degree which has still to be appreciated at the full; for, as Mr Hargraves very properly observes, "You have hitherto been supplying Australia with waste, unsaleable articles, incapable of being disposed of at home; but we (the Australians) have money to pay for what we really require, and will henceforth lead the fashion if you will supply us with fresh productions, and not restrict the colonial trade to the clearance of old stocks." He is now on a tour, in the course of which he has expressed his intention of visiting the Derbyshire, Welsh, Scotch, and Irish formations possessed of auriferous features, as he thinks he will at once be able to tell whether they are worth being worked or not. Gold, he has no doubt, is to be had at home; but he is of opinion it would cost 20*l*. an ounce to produce it. One thing Mr Hargraves seems particularly pleased with in his visit to England after twenty years' absence. When he landed he hardly expected to meet with the recognition of above two persons in the whole country—viz., his uncle, Dr Hargraves, of Tunbridge Wells, formerly physician to the Duchess of Kent, and another relative; but to his surprise and delight he finds himself well known to everybody, and entertained and welcomed wherever he goes.

The third document is a letter from Mr Hargraves to the Editors of the 'Herald,' dated in September, 1853, on the subject of THE GOLD GRATUITIES.

GENTLEMEN,—In your leading article of this day's date, on the subject of "gold gratuities," you state that the evidence taken before the Select Committee on the Gold Fields Management Bill establishes the claim of William Tom, James Tom, and John Lister to some reward for their exertions in assisting me to demonstrate my great discovery, but in your opinion you would be inclined to say the sum of 1,000*l.* was too large; and further, that it is clear from the evidence, or rather you say the evidence shows, that they assisted me with the understanding that, if the search proved successful, they should be benefited by it in some way or other, and that I engaged to represent their fair claims to the Government; and to show the feeling existing between them, you say, at the time Mr Hargraves told Lister that he expected to be made a Baron, and that Lister should be knighted. At what time, gentlemen, did I tell them? Was it at the time of the discovery? If so, I did not even know either of the Toms, and could have had no arrangement with *them*. The little bit of vanity I was guilty of which you refer to took place on the 12th of February, 1851, at the time of my first discovery, when Lister was simply my guide, bound to secrecy, as James Tom was afterwards. The words I uttered on that eventful day, at the time of the discovery, were—"This is a memorable day in the history of New South Wales; I shall be Baron Hargraves, you will be knighted, and my old horse will be stuffed and put in a glass case!" I need not say this conversation was, with regard to barony, knighthood, and putting my horse into a glass case, a mere joke. I therefore contend it does not show anything that could be possibly tortured into the sense you have endeavoured to convey, and from which you have drawn the conclusion of your second paragraph.

With regard to the individuals in question, the Messrs Tom and Lister,—I most solemnly declare that I never made any promise to them or held out any inducement except that I would instruct them in gold-mining, and they would have an opportunity of getting the first diggings; in consideration they were to guide me through the bush, and keep a strict secret anything they saw me do or heard me say. And in proof of this circumstance, I will relate a fact that may throw some light and tend to confirm this statement. When rumours of gold-finding first reached Sydney, Mr W. C. Wentworth wrote to Mr Tom, sen., who was a tenant of his, to ask him if there was any foundation in the gold stories in his quarter. Mr Tom referred Mr Wentworth's letter to me, stating he could not say anything himself, and asked me what he should say to Mr Wentworth, as he knew his son was bound to secrecy by me. My reply was, "Write to Mr Wentworth and tell him, if he wants to know anything about the gold to write to me." Mr Tom handed me the letter he had written to Mr Wentworth in reply, which stated that he, "Mr Tom," had no authority to say anything; but Mr Hargraves, the discoverer, would give him any information on application to him, addressed Guyong. I have no desire to oppose (if in my power to do so) the sum the Committee on the Gold Field Management Bill have recommended to be given to the Messrs Tom and Lister, any more than I would the claim of the shepherds who came out in charge of the merino sheep for Mr Macarthur, to a share in his princely estate of Camden, for most assuredly they have fully as good a claim to a portion of that estate, which was given him (Mr Macarthur) for the introduction of these valuable animals in the colony, as the Messrs Tom and Lister have to a participation in any reward I may be entitled to by my discovery of gold in this country.

Columbus conceived the idea of the existence of a great continent, but to carry it out to demonstration a ship and sailors were required. Was he who conceived the grand idea and proved it honoured and rewarded, or the sailors who worked the craft? Mr Macarthur conceived an idea that the introduction of the Saxon merino sheep into this country would prove a valuable acquisition, and carried out his plan at a great expense, with advantage to himself and the country. The Government rewarded Mr Macarthur with a principality called Camden, from which he anticipates a dukedom, earldom, or something of the kind. Do you, gentlemen, think Mr Macarthur was the proper person to be rewarded, or the captain who brought the sheep out? Or do you think the persons in charge who fed them on board? Or lastly, the blacks, who had never seen a Saxon merino before Mr Macarthur brought them, but who shepherded them on arrival, when they were made manifest and told they were Saxon merino sheep?

The only comparison to my case applicable would be that of the native blacks, who shepherded the sheep for Mr Macarthur, and that of Toms and Lister. I conceived the idea of the existence of a great gold-field in this country, at a distance of 12,000 miles, which conception was made on the faith of the uniformity of nature and of her unerring laws. It was the result of observation and reflection. I cherished the idea in my bosom, and when the winds of heaven were wafting me across the Pacific I gained daily in my belief, and in a few days after landing proved the fact to demonstration unaided and unassisted, except in the manner I have described. Mr Lister or the Messrs Tom had never seen a grain of gold in their lives any more than the blacks who shepherded the Saxon merinos for Mr Macarthur had seen sheep of this description. The Toms and Lister were told by me that they were in a gold-field. I told them I would instruct them in gold-mining, and point out to them when and how to obtain it; in consideration they agreed to conduct me through the bush, which they did; therefore the *quid pro quo* was fulfilled on both sides; and I do deny that these parties have any more claim on the Government than Mr Macarthur's shepherds have on Camden or the dukedom. With regard to the fourth paragraph of your article, wherein you state there is too much reason to believe that personal and class considerations have actuated some of the members of the committee in arriving at a conclusion with regard to my gratuity, I regret to say that no doubt can or does exist on this point. The *animus* is too plainly shown. Look, gentlemen, at Mr Wentworth's report. Such facts only are recorded that could not be possibly withheld. Look at the manner in which they are recorded, for brevity, as it were the pen to be replenished with fluid received from the very heart's blood of the writer writhing under the influence of extreme pain at its loss. And the whole tenor of the examination in committee by Messrs Wentworth, Bligh, and M'Leay was something like (as I should imagine) examinations before the Inquisition in the dark ages; and nothing did or could save me from being thrown overboard altogether but the perfect justness and righteousness of my cause; and, notwithstanding these members, I have a full belief and confidence in the Committee of the whole House, before whom my claim will be decided, that they will do their duty, both to me and to their country, with impartiality, and award to me that strict and impartial justice which has hitherto been denied to me, and I trust that justice will not be recorded in any other language than that which should always pervade that of British statesmen.

I regret, gentlemen, that after upwards of a period of two years from the time of my discovery I should be compelled to record facts that are not to be by any possibility contradicted, and those in self-defence, while seeking my just rights; and with your permission I will enter more fully into the question at issue in a few days. Meantime I thank you for the space you have kindly granted to me on this occasion.

I am, Sir, &c.,

Sydney, 26th Sept., 1853. EDWARD HAMMOND HARGRAVES.

The language of the Legislative Committees, more especially that of the Victorian Report, had, no doubt, caused much fulsome hero-worship of the kind just exposed to appear in various quarters, and considering the absurdity of many of the proceedings, they are satirised with no more than justice in the following TENTH PUBLIC LETTER to the Editor of the 'Empire' on THE DISCOVERY OF ALLUVIAL GOLD:

SIR,—A select committee of the Honourable the Legislative Council of New South Wales *discovered* that Mr Hargraves returned from California to Australia, "purposely to search for gold"—the *greatest discovery*, it must be admitted, of modern times; and competent judges in Victoria have decided that the report was "founded upon evidence."

A truthful satirist has said, that we should entertain a low opinion of human nature, if truly informed of the great enterprises of the world and the lucky accidents to which their success is owing; other well-meaning exponents and directors of the public mind, holding hero-worship to be an indispensable virtue, contrive, whenever an occasion offers and no other candidate is at hand, to invest any convenient incarnation with imaginary attributes, and then to hold up the decorated idol as a fit object for popular adoration. Perhaps few great men would improve in our estimation upon an intimate personal acquaintance—if we could take any individual of them into our tent to examine his physical proportions, moral qualities, and mental capacity, it is probable that not one would appear to an unbiassed judgment as admirable as when viewed through the eulogistic representations of skilful hero-makers.

Take a single instance—it may shock vulgar prejudices when Columbus is mentioned—but look the plain facts in the face. The distinguished navigator was not the first to conceive, nor did he ever prove that the world was round. This conception of a previous age was due to astronomy, for according to good authority "the spherical figure of the earth was known, and its magnitude ascertained with some degree of accuracy." Columbus did not originate the idea of reaching the East Indies by sailing westwards, since the "notion concerning the vicinity of India to the western parts of our continent, was countenanced by some eminent writers among the ancients," and indeed its existence in the west at some distance was a necessary consequence of the spherical figure of the earth. Columbus believed that the distance was not very considerable, and that by sailing directly westward he could easily reach the East Indies—*he tried and he signally failed.* The best of the joke is, that he returned to Europe, and knowing no better, actually said that he had succeeded; "these men of science and the astronomers," said he, chuckling over his own superiority, "are altogether mistaken, the world is not nearly so large as they say it is; India is not very far westward from Spain." At the present day every child is aware that the discoverer of America himself entertained a wrong opinion, the men of science are proved to have been right; the East Indies are far distant from the lands Columbus discovered; the islands and continent of America unexpectedly stopped the proceeding of the rash navigator in that direction, and had no such lucky accident fallen in his way, most probably himself and all his followers would have met an untimely end, the unpitied victims of a reckless adventure.

But Columbus was a very shrewd man, he importuned to be exalted from a comparatively humble condition to the command of a fleet, and stipulated for hereditary viceregal rights and a tenth share of all contingent profits, before taking any important steps in his ardour to demonstrate the exact position of the East Indies; he obtained an honourable appointment in anticipation of success; this circumstance alone proves the sagacity of the wily Genoese, serves as a lesson to modern discoverers, and affords an insight into the art of making great men.

A factious debater once scandalously tried to depreciate the acknowledged services of Mr Hargraves by representing that he merely brought down from Ophir "a few grains of gold in an old rag in his breeches pocket," but, at a public dinner on the 12th February, 1853, the Colonial Secretary more becomingly and truly related, that the gold Mr Hargraves first brought to him was properly folded in clean white paper, only so small in quantity that to see it "required the aid of a magnifying glass;" the next person who repeated the tale, using still greater magnifying powers, alleged that Mr Hargraves galloped into Sydney from the Turon, with his pockets full of nuggets; a grave writer tells the world that Mr Hargraves possessed a farm near

Bathurst, to which he returned from California, purposely to find gold upon it; and another author informs the public that he was a sheep-owner, whose live stock would have been worth fifty thousand pounds, had he not sold out to go across the Pacific. All these tales (except the Colonial Secretary's account) are utterly false; Mr Hargraves is in no way responsible for the many foolish things people choose to say about him. It was but lately a man at Nottingham took the extraordinary liberty of describing his personal appearance—the colour of his eyes, and his superior intelligence—in language that shows his remarks to be but a wretched parody upon the description of Mr Tittlebat Titmouse, by the Editor of the *Yorkshire Stingo*, and at the same time the audacious writer inferentially intimates that the Honourable the Colonial Secretary personated the renowned Oily Gammon.

These humorous authors have probably not yet finished their vagaries. Some popular writer—one of the Bladdery Pip order of mortals—will be producing an epic poem, a fashionable novel, or an historical romance, based upon a few of the facts of the gold discoveries, but having less regard for absolute truth than the manufacture of an attractive and saleable book. Mr Hargraves the hero, a man of profound wisdom and determined confidence, will appear like another sagacious and enterprising Columbus, and as the one was for a long time popularly believed to be the discoverer of a passage by sea to India, so the other will be described as the original discoverer of gold; Sir Charles Fitz-Roy and Mr E. D. Thomson will figure as the Ferdinand and Isabella of the happy event, continuing at the public expense to fit out renewed explorations. These patrons will be represented as monsters of perfidy, injustice, and ingratitude, just as the monarchs of Spain (having in the first instance bargained that Columbus should be the hereditary admiral and viceroy of all the new lands he should obtain for them), unceremoniously, after a fortunate issue, rewarded him with chains, a dungeon, and disgrace; so, it will be said, did their Australian imitators promise to reward the gold discoverer "in proportion to the magnitude of the discovery and its importance to the British Empire," and a paltry sum of ten thousand pounds was the shabby recompense they obtained for his disinterested achievements. Adding cruelty to insult, it will be shown that they did not even secure the empty honour of a Barony to the magnanimous individual who had so implicitly confided in their word of honour.

Those auxiliary discoverers, the Messrs Lister and Tom, will be treated as resembling the "unfortunate adventurers whose final disappointment inflamed their rage against Columbus to the highest pitch; they teased Ferdinand and Isabella incessantly with memorials containing the detail of their own grievances, and the articles of their charge against Columbus. Whenever either the king or queen appeared in public, they surrounded them in a tumultuary manner, insisting with importunate clamours for the payment of the arrears (the knighthoods) due to them, and demanding vengeance upon the author of their sufferings."

Francis de Bovadilla, a knight of Calatrava, it is on record, was appointed, in consequence of the accusations of such discontented persons, to repair to Hispaniola, with full powers to inquire into the conduct of Columbus, and if he should find the charge of mal-administration proved, to supersede him and assume the government of the island. Just in the same manner, it will be explained, was William Charles Wentworth, a representative of Sydney, appointed to preside over a committee, with full powers to inquire into the pretensions or merits of the great gold explorer, and if it should find the alleged services proved, to name the amount of recompense the great deeds deserve.

There was at the same time a rumour that the representative of Sydney possessed a gold vein, which supposed vein he eventually sold at a price incredibly enormous, but the immaculate and incorruptible gold discoverer, it will be averred, steadfastly refused to acknowledge that any such vein existed at all at the alluvial washings of the Wentworth gold field. "It was impossible," says the historian of Columbus, "to escape condemnation, when a preposterous commission made it the interest of the judge to pronounce the person he was sent to try guilty." It was equally impossible, the novelist will imply, that justice could be obtained under the circumstance in the modern case, and with virtuous indignation he will point to the aggravated injury done to exalted integrity, and compassionately repeat the distressing fact that the committee only recommended a miserably mean gratuity of five thousand pounds to the extraordinary man to whom they and so many others owed their princely fortunes. The Knight of Calatrava (the novelist will moralize) proceeded with the open daring valour of a highwayman, and his conduct contrasts favourably with the selfish statecraft and designing purpose of the degenerate representative of Sydney.

Bovadilla sent the condemned viceroy a prisoner to Spain. "Ferdinand and Isabella, foreseeing all Europe would be filled with indignation at this ungenerous requital of a man who had performed actions worthy of the highest recompense, instantly issued orders to set Columbus at liberty, invited him to court, and remitted money to enable him to appear there in a manner suitable to his rank. But though they degraded Bovadilla in order to remove suspicion of having authorized his violent proceedings, they did not restore to Columbus his jurisdiction and privileges as viceroy. He, however, demanded, in terms of the original capitulation in 1492, to be reinstated in his office of viceroy over the countries which he had discovered. By a strange fatality, the circumstance which he urged in support of his claim determined a jealous monarch to reject it. The greatness of his discoveries and the prospect of their increasing in value made Ferdinand consider the concession in the capitulation as extravagant and impolitic. He was afraid of entrusting a subject with the exercise of a jurisdiction that now appeared to be so extremely extensive, and might grow to be no less formidable. He inspired Isabella with the same suspicions, and under pretexts equally frivolous and unjust, they eluded all Columbus's requisitions to perform that which a solemn compact bound them to accomplish. After attending the court of Spain for near two years as an humble suitor, he found it impossible to remove Ferdinand's prejudices and apprehensions, and perceived, at length, that he laboured in vain when he urged a claim of justice or merit with an interested and unfeeling prince."

Now the novelist will go on to show that Sir Charles Fitz-Roy and Mr E. Deas Thomson had consulted Robinson's History of America, and they coolly determined to follow closely the dishonourable precedents offered by the chief magistrates of Spain; the great gold discoverer, despairing to obtain the reward of his deserts in Australia, resolved to appeal directly to the Queen of England in Council. All Europe was filled with indignation at the ungenerous requital his wonderful performances had met with; the *gratuities* provided him with money to enable him to appear at court in a manner suitable to his position. He demanded, in terms of the original capitulation in 1851, to be rewarded "in proportion to the magnitude of the gold discovery and its importance to the British Empire." By a strange fatality, the circumstance he urged in support of his claim determined its rejection. The greatness of the gold discoveries, and the prospect of their increasing value, made her Majesty's Ministers consider the concessions in the capitulation as extravagant and impolitic. The ex-governor and secretary were afraid to advise payment in full, since the claims now appeared so extremely extensive, and might grow to be no less formidable; they inspired her Majesty with the same views, and the British Government, under pretexts as frivolous as unjust, eluded all requisitions to perform that which a solemn compact bound them to accomplish. After attending the court of St James for nearly two years, the gold discoverer perceived at length that he laboured in vain when he urged a claim of justice or merit with an interested and unfeeling administration.

But Bovadilla, and the greater part of those who had been most active in persecuting Columbus, perished in a general wreck at sea. "Historians," observes Robertson, vastly proud of his vocation, "struck with the exact discrimination of characters, as well as the just distribution of rewards and punishments conspicuous in those events, universally attribute them to an immediate interposition of Divine Providence, in order to avenge the wrongs of an injured man. Upon the ignorant and superstitious race of men who were witnesses of this occurrence it made a different impression. From an opinion which vulgar admiration is apt to entertain with respect to persons who have distinguished themselves by their sagacity and invention, they believed Columbus to be possessed of supernatural powers, and imagined that he had conjured up this dreadful storm by magical arts and incantations in order to be avenged of his enemies." The new romance will attribute the failure of the aristocratical aspirations and selfish political schemes of Wentworth and the more active persecutors of the gold discoverer to a retributive justice avenging the wrongs of an injured man, and if, as the superstitious race of men believe, the gold discoveries are more due to magical arts and dark supernatural powers than to the honest endeavours of an uncompromised man, let the humane breathe a prayer that, when by fearful incantations the auriferous wizard shall call down vengeance upon his enemies, mercy may be extended to the inconsistent Victorian legislators.

The black fellow who guided Mr Hargraves over the Western districts will be delineated as a native prince—a duplicate *Caçique Guacanahari*—who unsuspectingly conducted Columbus to the gold mines of Hispaniola, and then gladly purchased forbearance from the rapacious invaders of his country by an unconditional surrender of all the gold his hereditary dominions contained. The Rev. W. B. Clarke will, of course, be introduced, probably as the implacable bishop of Badajoz, who continued to contend, even after tangible proof of the affirmative, that *America was not in the East Indies*, and learnedly argued to the last extremity against the alleged demonstration by Columbus; the modern churchman will be represented as actuated by inveterate animosity to intuitive genius, opposed to all new theories, and charged with continually whispering disparaging suggestions into the ears of the quasi-sovereigns; while I shall most likely be described as the worst character of the whole lot—the very Amerigo Vespucci of gold discoverers, of whom it is said—"Soon after his return he transmitted an account of his adventures and discoveries to one of his countrymen (in Florence), and labouring with the vanity of a traveller to magnify his own exploits, he had the address and confidence to frame his narrative so as to make it appear that he had the glory of having first discovered the continent in the New World. The country of which Amerigo was supposed to be the discoverer came gradually to be called by his name. The caprice of mankind, often as unaccountable as unjust, has perpetrated this error. By the universal consent of nations, America is the name bestowed on this new quarter of the globe.

The bold pretensions of a fortunate impostor have robbed the discoverer of the New World of a distinction which belonged to him. The name of Amerigo has supplanted that of Columbus; and mankind may regret an act of injustice which, having received the sanction of time, it is now too late to redress." What the historian writes of the navigator, so will the novelist, changing but a few words, say of me—"Mr Davison magnified his own exploits, he framed narratives to make it appear that he had some share in the glory of the gold discoveries, he wrote a theory after pirating original ideas from his illustrious prototype, and made the world believe it all came out of his own head;" thus the writer will insist did the bold speculations of a fortunate inquirer rob, by his theory, the gold discoverer of a distinction that belonged to him. The theory, of which Davison is supposed to be the author, supplanted that of Murchison, and anticipated a far superior one already in preparation. By an early publication in a local newspaper, he prematurely disclosed many leading principles, and produced a hybrid system of much plausibility; but, in reality, as far removed from the scientific heights of Clarke on the one hand as from the practical depths of Hargraves on the other. The caprice of mankind, it will be significantly noted, has perpetrated the error, and may regret an act of injustice it is now too late to redress." Such will be the fictitious tale.

The careful searcher after truth, not to be deluded with the flourishing accounts of novel writers, referring to the page of history, will read that "Columbus early communicated his ideas concerning the probability of discovering new countries, by sailing westwards, to Paul, a physician of Florence, eminent for his knowledge of cosmography, and who, from the learning as well as candour which he discovers in his reply, appears to have been well entitled to the confidence which Columbus placed in him. He warmly approved of the plan, suggested several facts in confirmation of it, and encouraged Columbus to persevere in an undertaking so laudable, and which must redound so much to the honour of his country and the benefit of Europe;" and the reader will ask, did the gold discoverer consult with any cosmographist who, like Paul, warmly approved of the plan, suggested several facts in confirmation of it, and encouraged perseverance in so laudable an undertaking? It can only be said in reply, that the official report mentions no such person, the question being considered by the committee of inquiry as extra-judicial; it was the opinion of that body of wise men, that the *ipse dixit* of gold discoverers, and a distribution of gratuities in proportion to the assertions of each claimant, was the least tedious method of inquiry; they found, by the affirmation of the gold discoverer himself, that he had returned from California purposely to search for gold, and it needed, in their estimation, no Paul to explain the circumstances.

"To a mind less capable of forming and executing great designs (or of more implicitly relying upon the opinions of Paul, as the case might be) than that of Columbus, all those reasonings, and observations, and authorities would have served only as the foundation of some plausible and fruitless theory, which might have furnished matter for ingenious discourse or fanciful conjecture. Fully satisfied, himself, with respect to the truth of his (or Paul's) system, he was impatient to bring it to the test of experiment." The reader may demand what was the gold discoverer's system? And again, it may be answered that the committee held it to be extra-judicial to ask if he had any system, or if he believed in the theory of any encouraging Paul; but since they discovered that he had returned "purposely to search for gold," they presumed that he was competent to comprehend "all those reasonings, and observations, and authorities, which served as the foundation of a plausible though not a fruitless theory, which soon afterwards appeared.

"The first step of Columbus towards discovery was to secure the patronage of some of the considerable powers in Europe capable of undertaking such an enterprise. He made an overture to John II, King of Portugal. Here every circumstance seemed to promise him a favourable reception. The King listened to him in the most gracious manner, and referred the consideration of his plan to Diego Ortiz, Bishop of Ceuta, and two Jewish physicians, eminent cosmographers (the geologists and mineralogists of their day), whom he was accustomed to consult in matters of this kind. The persons according to whose decisions his scheme was to be adopted or rejected, had been the chief directors of the Portuguese navigations, and had advised to search for a passage to India by steering *a course directly opposite* to that which Columbus recommended as shorter and more certain. They could not, therefore, approve of his proposal without submitting to the double mortification of condemning their own theory, and of acknowledging his superior sagacity." The reader will perceive that the proposal of the Genoese was directly contrary to that of the King's advisers. The theory of which the alluvial gold-discoverer was the first proselyte, recommended the search for gold in Australia to be made in the interstices of slates; the official advisers, on the contrary, decided that the examinations ought to be made in the quartz veins and rocks, from which they said all alluvial gold had been disintegrated. "But true science," says Robertson, "had hitherto made so little progress that the philosophers selected to judge in matters of such moment did not comprehend the first principles upon which Columbus founded his conjectures and hopes." Nor, it may be said, until the theory that guided the alluvial gold-discoverer appeared, could the geologists comprehend the first principles upon which he acted, nor could they, more than the King of Portugal's advisers, approve of the new system without the double mortification of condemning their own theory, and acknowledging that the alluvial gold discovery, and the discovery of gold in quartz-veins were not necessarily identical. The Portuguese cosmographists, " After teasing Columbus with captious questions, and starting innumerable objections, with a view of betraying him into such a particular explanation of his system as might draw from him a full discovery of its nature, deferred passing a final judgment with respect to it." The geologists of Australia, in like manner, vainly teased the alluvial gold-discoverer with captious questions, and perused his official correspondence to find such particular explanations of his system as might draw from him a full discovery of its nature, but neither they nor the Colonial Government could ever discover the coherency of his observations ; and if the alluvial gold-discoverer really had borrowed any useful principles from the ingenious discourse and fanciful conjectures of an unknown Paul, it soon became obvious that Paul himself could alone explain the whole system. Occasionally the great gold-discoverer made reference to a friend Davison; but a belief prevailed that the obscure friend was merely a useful myth—a fabulous personage—an ideal creation of convenience, having no corporeal entity.

But my novel writer will be instructed to oppose a still more extravagant romance—there is no effect he will argue without an adequate cause. Providence employs intelligent agents, and these, in turn, direct other subordinate instruments to effect his purposes. Those magnificent puppet-kings which dazzle the wondering eyes of rustics at a country fair have their strings pulled by unseen hands from behind; monarchs of the stage are controlled by managers and employers, and sovereigns more substantially regal, in like manner, by their ministers. Napoleon had his Talleyrand ; Warwick was a king-maker: thence, drawing analogous conclusions, the writer of romance will make it apparent that a man of science, of Permian celebrity, had long reigned absolutely as king of the gold mines, but suddenly there arose amongst the diggers a king-maker, and he, finding the self-confident scholar puffed up with the pride of false knowledge, authoritatively proclaiming from his presidential position dangerous doctrines treasonable to true science, forthwith took pains to overthrow the tyrant, and elevate a practical digger to rule in his stead. All men rendered a willing allegiance to the new dynasty : but the upstart sovereign proving ungrateful and incompetent, was, in turn, dethroned; and finally, another son of science was restored to the throne of his ancestors. Such shall be the counter-fiction, properly spiced to suit the public taste.

The greatest practical gold-discoverer that ever lived languished in neglect at the time the gold gratuities were distributed. The term " greatest practical discoverer " signifies the one who obtained the largest amount of gold with the least possible labour, aided by the smallest modicum of knowledge—in short, it means modest aboriginal

Jackey, the finder of the monster nugget at Louisa Creek. There was at the Antipodes in those days no enterprising Barnum equal in ability to the great American model; that able philanthropist could easily have made terms with Jackey, and amassed a fortune upon the speculation of his exhibition in Europe as a prodigy. He would have engaged an orator to recount and expatiate upon his performances. The speaker would relate, when addressing enlightened audiences, that Sir Roderick Murchison predicted by the aid of Palæontology, and Jackey demonstrated by the light of innate genius, the existence of monster nuggets in Australia. The extraordinary aboriginal perceived by intuition that the fulness of time had come (the planets being in favourable conjunction); therefore he took seven times seven steps from Louisa Creek towards a quartz ridge; the lifting up his eyes to the sun, and striking the earth with his staff, "Here," said he confidently, "ought to be the first monster nugget, and, looking at his feet, sure enough there lay *a hundred pounds weight of pure gold in one solid lump* (profound sensation). Envious detractors, the declaimer would shout with wild excitement, have tried to represent it all as an accident, and "Oh, dreadful shame!" would burst sympathetically from the indignant assembly. The lecturer, again calming himself, might proceed to add: Jackey was not greedy; with noble disinterestedness he said, "Discovery has no parts, there are plenty more large nuggets at Ballarat; let the poor pale-faced strangers have the rest; my mission is fulfilled; I have taught mankind how to find monster lumps of gold; the forest yields opossums—the rivers fish—ignorance is bliss—I will return to my my home in the wilds." But Barnum, the benefactor, it would be shown, came to the rescue: "No," he exclaimed, "never shall such distinguished merit retreat into obscurity—the learned and the noble shall view the nonpareil face to face—stubborn science shall succumb to the light of intuition." And now the speaker might significantly conclude the hat will go round to receive any gratuities that an intelligent public may be pleased to bestow. If credulity and generosity be not exhausted, the hat would certainly be filled to overflowing. The great nugget business, the practised showman would say, was unskilfully handled; the Baronet and the Blackfellow might both have been made Barons, and Barnum himself advanced to the post of Governor-General.

Sir Roderick Impey Murchison, once upon a fine day, after dinner and wine, recommended practical tin-washers, it is said, to undertake a voyage of thirteen thousand miles, to penetrate into the interior of Australia, "purposely to search for gold" (tarrying at home himself, and contributing nothing towards the passage-money); but if that learned geologist had gone to California, turned a working digger, and found out that his abrasion-hypothesis is altogether untenable—that the doctrine of "equal-dissemination-in-granite" is utterly unfounded—

had he discovered that alluvial gold is moulded in shape to the rocks upon which it reposes, and that the rounded quartz pebbles overlaying alluvial beds of clean granular gold are not charged with visible specks of the precious metal (those accidents of united gold and quartz called specimens, the formation of which is demonstrable by experiment, being found in the beds of gold, not as some suppose indiscriminately mixed amongst the so-called waterworn pebbles)—so much correction of error and increase of knowledge would have shaken Sir R. Murchison's confidence in the integrity of his whole system to such a degree that he would have shrunk from the responsibility of such haphazard advice. But had the celebrated trilobite classifier known of any Cornish tin-miners emigrating to Australia in pursuit of other business, it is likely that he would have given them the benefit of his knowledge, pointed out the probably auriferous localities, and encouraged trials to be made. This is all I can boast of having done. My own views negative of the abrasion notion was the fruit of field observation engrafted upon the broad principles of science and rudimentary geology, and in direct opposition to his inadmissible doctrines. The demonstration of those views by the instrumentality of Mr Hargraves in Australia, where the physical aspect of the country, in its gold-producing districts, was already familiarly known to me, has proved commercially important beyond all human expectation and probability. The results have been immense in magnitude, the principles have been but local in application, nevertheless their main features remain as immutable truths, and will continue when the wranglings and contentions of the day shall have passed away.

After discovering the falsity of the Murchison doctrines it was quite impossible for any person whatever to have foreknown with certainty in 1850 how immensely rich were the gold deposits in the Australian Cordillera, even although the frequent finding of gold in quartz by the shepherd Macgregor was then a known fact The natural cause of the origin of alluvial gold deposits had been wrongly explained, and still remained a mystery, except as an incipient inquiry. The hand of Mr Hargraves first demonstrated in Australia the existence of gold moulded upon the surface of slates, and proved the universality of great principles entirely overlooked by the scientific world. The subsequent development of the great extent, extraordinary richness, and particular localities of alluvial gold deposits in Australia, is due to the efforts of a large body of operative diggers, guided by certain general considerations respecting the petrific character of bedding rocks, and the direction of mountain trends, as explained, at an early date, by the Rev. W. B. Clarke. The titled prognosticator in post-prandial conversations, or practical charlatans from equivocal motives, may in propitious moments have foretold their vast extent and unprecedented richness. Jackey the genius, or Calvert the boaster, may in turn be held up to popular admiration as the more eccentric originality, accordingly as their Barnums or Oily Gammons may prove to be the more capable men of business; but, for my part, I cannot admit that any one extravagant predicter of gold ever believed his expressed wishes, hopes, or opinions, with sufficient confidence to have made any considerable pecuniary or personal sacrifice upon the chance of the Australian gold fields turning out as gloriously rich as they have done. Scepticism concerning great men is perhaps my foible; I could hardly have believed, had the assurance rested upon less honourable authority, that Mr Hargraves had returned from California to Australia in 1851, "purposely to search for gold."

I am, Sir, &c.,

12th September, 1855. SIMPSON DAVISON.

POSTSCRIPT.

Second phasis of an historical parallel.

The men of science in Europe, at the close of the fifteenth century, obstinate in their belief that an Eastern passage to India might yet be discovered shorter than the Western one which Columbus was alleged to have demonstrated, prevailed at length upon the King of Portugal to persist in his grand scheme of opening a passage to the East Indies by doubling the southern extremity of Africa. The king accordingly equipped a squadron, and gave the command of it to Vasco de Gama, who, after various adventures, arrived in India at Calecut, upon the coast of Malabar, in May, 1498, and returning again to Europe, landed in Lisbon, after an absence of two years, two months, and five days. "In comparison with events so wonderful," says Robertson, "all that had hitherto been deemed great and splendid faded away and disappeared." The ardent admirers of the practical sagacity of the navigator Columbus, and the implicit believers in the science of the Bishop of Badajoz, were now equally disposed to believe that each discoverer had attained the same end, of opening a passage by sea to India, though found by sailing in opposite directions. "The merchants, without attending to this discussion, engaged eagerly in that lucrative and alluring commerce which was now open to them."

The gold diggings at Ballarat in Victoria were, in an official report, declared to have been substantially discovered by Mr Thomas Hiscock, who candidly owned he had been induced to examine that locality by reading the geological writings of the Rev. Mr Clarke. Of the astounding productiveness of these newly-discovered gold mines it may be truly said, that "in comparison with events so wonderful all that had hitherto been deemed great and splendid faded away and disappeared." The admirers of the practical performances of Mr Hargraves and the believers in the scientific declarations of the Rev. Mr Clarke now agreed in opinion that each discoverer had arrived at the same just conclusions by entirely different methods;—the one, while maintaining that alluvial gold had been degraded from quartz veins, and the other, by obtaining gold from placer deposits, without ever having seen a veinstone of gold bearing quartz; the Australian merchants, stockowners, and landed proprietors, without attending to these theoretical discussions, engaged eagerly in the lucrative commerce and beneficial appropriation of the enormous wealth which was now everywhere open to them.

Third phasis of an historical parallel.

The Bishop of Badajoz, now Spanish Minister for the Indies, and in that capacity director of the several expeditions of discovery despatched by his Government to the New World, resolved to vindicate the cause of science by exposing the arrogant conceit and deceitful imposture of Columbus, whom he alleged had never reached India at all, nor yet practically proved the earth to be round. The services of Ferdinand Magellan, a Portuguese, were engaged for this arduous task, which required not only the negative proof that America was not India, but also the accomplishment of the original and favourite subject of Columbus, wherein he had so entirely failed, namely, to demonstrate practically by circumnavigation the theory of the rotundity of the earth.

On the 10th of August, 1519, Magellan sailed from Seville with five ships, and after suffering incredible distress in the longest voyage that had ever been made on the unbounded ocean, doubled Cape Horn, and reached the Moluccas in the East Indies, " to the astonishment of the Portuguese, who could not comprehend how the Spaniards, by holding a westerly course, had arrived at that sequestered seat of their most valuable commerce, which they themselves had discovered by sailing in an opposite direction." But Magellan unfortunately lost his life at the Moluccas, and the coveted honour was reserved for his subordinate in command, Juan Sebastian del Cano, to complete this great practical undertaking, and return eastwardly to Spain by the Cape of Good Hope, after having sailed round the globe in the space of three years and twenty-eight days.

To continue the parallel, the Rev. Mr Clarke, having been appointed by the Crown to survey the gold fields of New South Wales, as well as to direct the several Government explorations, resolved to vindicate the cause of science by disputing that any new discovery in physics or philosophy had been made by the revelation in Australia of gold in placer deposits. He averred that the errors and misinterpretations of geologists in Europe were not the deductions of science for which he—the first scientific discoverer of gold in Australia—could be held responsible: the " equable-dissemination " doctrine being, he admitted, merely a myth—the brain-creation of parlour philosophers, to which he had never assented: and while he (the Rev. Mr Clarke) concluded that some alluvial gold had undoubtedly been originated by the abrasion of quartz veins, yet that origination had never, he alleged, been looked upon by him as the sole source of alluvial gold; and considering that Mr Hargraves had failed to expound any other theory of which his gold finding was the demonstration, the inquiry had only followed in due course, whether or no any other practical person like Magellan—whose demonstrative proof of the earth's rotundity far surpassed that of Columbus—could prove the placer deposit gold discovery to have been made according to the rules of abstract science combined with acquired practical experience.

Finally, it may be now suggested that Sir Roderick Murchison, by visiting the gold-fields of Australia, and availing himself of all the practical discoveries and explanatory theories hitherto accomplished, and uniting with them his own scientific resources and superior knowledge, may yet demonstrate the infallibility of his so-called scientific views, and in circumnavigating the whole question of the origin of gold, at last prove himself to be the Sebastion del Cano of gold discoverers in Australia.

S. D.

Part Ninth.

SIR RODERICK IMPEY MURCHISON AND THE REV. WILLIAM BRANWHITE CLARKE.

An Address from Sir Roderick Murchison to the assembled Australian colonists delivered seven years after the commencement of gold-washing in Australia, together with a biographical sketch of the Rev. Mr Clarke which appeared in a public journal about the same time in Sydney (where the latter then resided, and which he may probably have revised) are both here republished in order to place the reader more fully in possession of the respective claims made by each of these scientific predicators of the gold discovery. The 'Times' reported the celebration of the Seventieth Anniversary of the settlement of the Australian Colonies on the 26th January, 1858, by a public dinner in London at the Albert Tavern, the chair being occupied by Sir Charles Nicholson, D.C.L., and late speaker of the Legislative Council of New South Wales. The 'Sydney Herald,' after republishing in the colony the numerous patriotic and congratulatory addresses of a general character, reported a few days subsequently the following two particular speeches relating especially to gold discoveries, in consequence of the Editors having received communications on the subject from Sir Charles Nicholson, Sir W. M. Manning, Mr T. S. Mort, Dr Dobie, Mr G. A. Lloyd, and Mr Archer; and being thus enabled to present a full and accurate report of the speeches delivered on the occasion.

Lord **Alfred Churchill** said: In giving the toast which it has fallen to my lot to propose, viz., "Prosperity to the Gold-fields of Australia," I feel I must couple with it the name of Sir R. Murchison, to whom was due the credit of having first foretold its existence. During the last three hundred years I cannot remember more than even half-a-dozen great men who, by the force of their own intuitive genius, had made discoveries having greater weight upon the destinies of the world, and in ameliorating the condition of mankind, than that of gold in the Australian colonies. In the earlier ages, as light and intelligence were but beginning to dawn, the discoveries of Galileo and Columbus, and subsequently those of Harvey, Sir I. Newton, and Adams, might each be quoted as instances of that genius which had been severally followed by a great stride in the general intelligence and material social progress of society; but in these later days the discovery of gold might be fairly said to have eclipsed the others in its happy results. I trust that, when the circumstance is fully known, that honour will fairly be acceded to Sir R. Murchison. Sir R. Murchison, in his earlier life, had visited the gold districts of the Ural Mountains in Russia, and had received many marks of distinction and honour from the Emperor of Russia for his various researches in those districts. In 1844 he was examining various mineralogical specimens shown him by Count Strzelecki from the eastern portion of Australia, when he was struck by their similarity to those of the Ural Mountains and the general north and south districts of the geological formation. In consequence of this resemblance he read a paper before the Geographical Society in that year upon the possible existence of gold in Australia. In 1846 he was consulted by Sir C. Lemon for suggestions which might tend to help the workmen in his county (Cornwall). Upon this Sir R. Murchison recommended their emigrating for the purpose of seeking for gold in the Australian drift, much in the same way that they did for tin in their own country. In 1848 he received letters from two individuals in Australia, named Smith and Phillips, who, having heard of his vaticinations, wrote to inform him that they had actually discovered gold, and forwarded specimens of quartz containing it. Sir R. Murchison immediately brought the subject before the notice of the Colonial Office, and instigated them to remove the heavy restrictions which prevented any further search for the precious metals. He knew what it is to move the Colonial Office, and on this occasion they fully bore out their character, and all Sir R. Murchison's endeavours were futile. Had it not been for the discovery of gold in California, the question had never again been opened. Honour to Hargraves, who first discovered a workable gold-field; but had Sir R. Murchison's vaticination been followed up, Australia would have been a gold country in 1848, instead of waiting for 1851. (Loud cheers).

Sir **Roderick Murchison** then rose and said—Sir Charles Nicholson, my Lords and Gentlemen: Whilst I heartily thank you for the very high honour you have done me in coupling my name with the discovery of gold in Australia, it would ill become me not to disclaim the over-flattering compliments which my noble young friend, Lord A. Churchill, has paid me, and above all, if I did not deprecate his comparison of the prediction of a hard-working geologist with some of the profoundest inductions of the greatest philosophers. No, gentlemen, my story is soon told, and is plain, short, and intelligible. Whilst I am the last man who would snatch from others their participation in the great event which has raised your colonies to their present pitch of [illegible] fully accept that amount of praise which you may [illegible] to my humble efforts. In few words, these efforts [illegible] that in 1844 I began to predicate the advent of Australian [illegible] that in 1846 I publicly advocated the search for it; third, [illegible] I called the attention of the British Government to gold [illegible] had then been discovered; and fourthly, that I published these [illegible] accompanied by various other writings, in succeeding years, and [illegible] took place long before the practical opening out of your [illegible] the memorable year 1851. Let me, however, explain that, [illegible] having been in Australia, I could not have formed my first [illegible] had I not had the advantage of seeing numerous rock specimens in the year 1844, which my distinguished friend Count Strzelecki had brought home for the illustration of the excellent work which he published in 1845, the result of several years of the arduous researches of that intelligent and high-minded man who explored the eastern range of New South Wales, and followed the western bend of that chain from his own Mount Kosciusko to Port Phillip, and even to Tasmania. Having then just returned from an exploration of the Ural Mountains, I could not avoid being struck with the similarity of the chief rock masses of Australia to those of the Siberian chain, and knowing that similar matrices usually produce similar mineral substances, opined that gold ought to be found in our Australian colonies, though it "had not yet been discovered in them." At that time (1844), and long afterwards, I was entirely ignorant of the existence of auriferous specimens in the colonies; but being called upon in the year 1846 by my esteemed friend Sir Charles Lemon, the President of the Royal Geological Society of Cornwall, to express my sentiments at a public meeting at Penzance, and to suggest some method of relieving the wants of the many Cornish miners who were then out of work, I boldly urged those men, who were well acquainted with the processes of digging and washing tin ore, to emigrate to Australia, and there extract gold from the superficial detritus of that country, just as they found the tin ore at home! Although my opinion (which was, it will be remembered, expressed before the discovery of the Californian gold) made little impression on the general public, and was scarcely known beyond scientific circles, though printed in the Transactions of the Geological Society of Cornwall, some Cornishmen did emigrate to your colonies. Other persons also heard of my anticipations and advice, so that, on my return from a long exploration of the Alps and Apennines in 1848, I perceived, by letters from Australia, that I had already got some reputation there, for two correspondents, a Mr Smith and a Mr Phillips, both unknown to me, wrote to me of gold being absolutely found, and even sent me small specimens. Then it was that I deemed it my duty, as a well-wisher to my country, at once to acquaint the Secretary of the Colonies with the fact that what had for four years been a theory in my mind was realised; and that as in the tracts where some specimens of gold existed much might be found, I begged her Majesty's Government seriously to consider the best and steadiest mode of developing this wealth, and also to modify the mining laws. I do not blame the noble Earl Grey, who was then Colonial Minister, for his opinion as a statesman, an opinion held by many other eminent men, that the opening out of gold-fields might derange a pastoral population like that of Australia, whose wealth and prosperity had been raised upon sheep farming; but I simply record the fact to show that, come what might, I had done my duty as a mining geologist who followed science for its own sake, in announcing to my own Government, not the theory of finding gold, ***but the absolute discovery of that metal***—a discovery which might change not only the whole condition of Australia, but probably the relations of the world. As this letter of mine lay unknown for five years in the archives of the Colonial Office, and was not printed until long after the practical opening out of the gold-fields, and the publication of huge blue books in which my name was never mentioned, I requested that the document might be printed, and the Duke of Newcastle directed its publication to take place in the last of those voluminous records on the subject. You will then see how little my countrymen at home, still less the colonists, could be acquainted with my doings, all of which, even the last, took place, I repeat, long anterior to the practical opening out of the great gold-fields of New South Wales and Victoria. After this brief explanation I think you will admit that my anticipations and advice, whatever they were worth, did not proceed from a Roderick Random. Let me once more, gentlemen, disclaim on my part the remotest desire to derogate from the just claims of the persons who have distinguished themselves as Australian gold explorers; for after the subject burst upon the public and became the daily food of our newspapers, other persons (it was then for the first time announced) had discovered gold, but had never published the facts. In this way it had remained entirely unknown to me, and indeed to all scientific men in Europe, that Count Strzelecki and the Rev. W. B. Clarke, both valued friends of my own, had previously broached the subject in letters to colonists, &c. On this head they have indeed both borne testimony, that my inductions were drawn entirely irrespective of any discoveries which they made, but had suppressed in deference to the Colonial Government. Let each man of science have his due share in this great event—let the observations, writings, and labours of Strzelecki, Clarke, and others, and the practical workings of Hargraves have each their well-merited praise—but I may be excused for saying that if the British Government had acted on my suggestions in 1848, I should certainly have obtained long ago from the colonies that acknowledgment which you have this day accorded to me, and which is the best reward a man of science can obtain at the hands of his enlightened countrymen. In various other publications on the subject of gold, also printed before the practical workings began, I alluded to the coining gold of Australia, whether in a lecture before the Royal Institution, in a memoir read before the British Association for the Advancement of Science, or, finally, in the article Siberia and California, of the 'Quarterly Review' of 1850. In those works I was, indeed, so bold as to differ from distinguished statists and statesmen who held opinions which, as an observer of facts, I never could understand respecting the evil which it is supposed would follow from a too great influx of gold. When I formerly speculated on a considerable increase of gold from Siberia, and long before the Australian gold was discovered, the illustrious Sir Robert Peel, for whose memory I entertain a profound respect, expressed to me by letter his hope "that we might not have too much of a good thing." Yet have we not seen how the impoverished countries of Europe, which had no metallic currency, have rapidly absorbed all our superfluous gold, and do we not know how ardently our merchants and bankers looked for a fresh supply of that good thing? Nay, do we not all feel how seasonable and providential was the arrival of Australian gold during the recent panic? But I must not wade be-

yond my depth, nor dare to contend with those ingenious gentlemen—the political economists. I must indeed confess that I have perhaps ventured somewhat too far in my estimate of the natural limit or restriction of the supply of gold in what I have called "the Bank of Nature." In speculating on the future, the naturalist has, however, but one safe course before him. He must judge of what is to come by what has past; and as the history of mining, from the time of Job to the present period, has taught us that gold is on the whole superficial, as regards the crust of the earth, and has never been largely or profitably extracted except by diggings in *debris* derived from the abrasion of rocks, so the period has sooner or later invariably arrived when each country that was auriferous has ceased to be so. On the relation of silver to gold I still maintain what I have always contended for, that whilst gold is a superficial product whose veins diminish and thin out downwards, silver being found in the greatest abundance in the deeper seated lead-bearing rocks, will in the long run maintain its old relation to the more precious metal. Happily, indeed, for Australia, her golden wealth exceeds anything ever previously recorded—her troughs of broken auriferous materials are richer than those of any country ever explored, save parts of California; so that many years will doubtless still elapse before this golden produce is exhausted; and long before that time arrives the continent of Australia will, I confidently prophesy, contain the richest and most industrial colonists of the British Crown, and that the inhabitants of all classes in that fine country will continue to bless the day when the gold-fields were discovered.

Without inquiring at present whether or no Mr Hargraves really discovered the *workability* of the gold-fields, as Lord Alfred Churchill affirms, and as the Messrs Lister and Toms have disputed (whose testimony, reprinted in Appendix H, it is possible his lordship may never have perused), I may here introduce a few remarks on Sir Roderick Murchison's speech. The general view I have taken of the claims of science to the gold discovery is set forth in a third public letter, and in substance the sentiments it expresses remain unaltered by aught above stated. But if it be yet maintained by the authority in question that all alluvial gold has been "derived from the abrasion of rocks," such as quartz and granite, and that no new philosophical discovery has been made, then I think that Sir Roderick Murchison, as the organ of men of science generally—no less in his own justification than in that of the Rev. Mr Clarke—ought from the first to have protested with all his force against the large differential reward given to the local discovery of Mr Hargraves, whom no one can in good faith allege to be "the first discoverer of gold"—who never even obtained a larger quantity of gold in Australia than the Rev. Mr Clarke had already found—or than Sir Roderick Murchison himself appears to have previously received from Australia in 1848.

The introduction into the colony of the simple art of washing the soil for gold, it is to be observed, cannot be claimed by any single individual, but had been brought over before the 12th February, 1851, by numerous miners who had themselves learnt the art of gold-washing in California. It should also be stated that the Mr Smith who is mentioned, *purchased* the gold which it appears he sent to Sir R. Murchison in England, for he never discovered any gold in Australia himself. Mr Smith is chiefly known in the colony as having exhibited to the Colonial Secretary a lump of gold found by a shepherd about the year 1846 in the very neighbourhood where Mr Hargraves washed out the first gold on Summer Hill Creek. This shepherd only found one piece of gold, and could never find any more ; but another shepherd—the more notorious Macgregor—had collected at various times *numerous pieces* near Wellington (about fifty miles distant from the former place),.and I presume that some of these may have been the specimens which came into possession of Mr Smith and Mr Phillips, and were by them forwarded to Sir Roderick Murchison in 1848, since neither of these persons claim to be actual gold-finders.

It is one of the many remarkable circumstances connected with the gold discovery of Mr Hargraves that a number of practical Cornish tin-washers were already settled near Summer Hill Creek, in a village called "The Cornish Settlement," at the time of his washing the first auriferous earth on that prolific gold-bearing watercourse, and besides these operative tin-washers there were in the locality several settlers and farmers of somewhat better education from the mining districts of Cornwall, who regularly received local newspapers from that part of England. Such persons may be supposed to have seen notices in the public prints of Sir Roderick Murchison's gold-seeking recommendations, as reported in English and especially in Cornish newspapers. However, if at any time they did see them, nothing ever came of the information, for neither they nor the practical tin-washers in the neighbourhood had ever obtained any gold by washing the deposits of the streams in that highly auriferous district. The intention claimed by Sir Roderick Murchison of relieving the wants of distressed English tin-miners by persuading them to venture to Australia in 1846, at their own risk and cost, to wash for gold, appears to have been altogether a most impracticable project, and if attempted by them would undoubtedly have resulted in distressing failure, for such persons in all probability would never have reached beyond Paramatta, still less likely would they have been to cross over the Blue Mountains. The only chance of their success would have depended upon their proceeding to the interior either under the auspices of Government or of some committee in England, willing to provide the necessary funds. Sir Roderick Murchison at that time possessed the confidence and enjoyed the privilege of being the consulting geologist of the Imperial Government, and an opportunity was at length considerately afforded him of testing the auriferous character of Australia entirely at his own discretion.

The Local Government of New South Wales requested the Imperial Government, about the year 1846, to despatch from England some competent person to make a geological survey, and to ascertain the mineral resources of the colony. The nomination and selection of a suitable person was referred to Sir Roderick Murchison, on whose recommendation Mr Samuel Stutchbury, a skilful geologist, was appointed to New South Wales, and accepted as the Government geologist, at a salary of 600*l.* per annum. The complaint, therefore, which Sir Roderick would urge of the negligence of the Imperial Government in not acting upon his suggestions, appears to be quite unfounded. Mr Stutchbury had been some time making explorations in the colony, and was temporarily resident in the auriferous districts near Bathurst in 1851, when the Colonial Secretary in Sydney wrote to him officially, saying that a person of the name of Hargraves had represented to him that the western slope of the main range was generally auriferous, and that a gold-field existed in the neighbourhood of Bathurst, and he (the Colonial Secretary) officially required an opinion on the matter from him—the authorised Government geologist. To this demand Mr Stutchbury officially replied that "*he could see no evidence whatever of the precious metal in the western districts!*" and even after this communication he remained some time in ignorance, until Mr Hargraves in person demonstrated the fact to him by direction of the Executive Council. So little did the best geologists understand the subject at that time. It cannot be doubted that Sir Roderick Murchison would have given just the same reply had he been himself in the same position, for the fundamental assertion maintained by him that the metallic grains in placer deposits have been derived from the abrasion of quartz and other stony rocks, is an hypothesis eminently calculated to mislead those who are practically inexperienced in gold-searching. In proof of this I can refer to no better instances than the localities of the two gold discoveries. Mr Hargraves found placer deposits of gold upon a creek where no gold-bearing veinstones have yet been discovered, while the shepherd Macgregor obtained his gold from an auriferous quartz-veinstone in a locality where no placer deposits have yet been found; at Goodgood, too, there is gold in the soil, but there is none in the quartz-veins.

Considering that in 1846 Sir Roderick Murchison publicly advocated the search for gold in Australia, and that in 1848 he called the attention of the British Government to the gold which had then been discovered in the colony, may I ask why, instead of sending a man of science, ignorant of gold-washing, did not this high geological authority send a practical tin-washer to New South Wales, or at any rate require Mr Stutchbury to take a few lessons in tin-washing before starting to find the gold-fields which had been predicated? But since his chosen instrument, Mr Stutchbury, *failed to prove* his philosophical views, and since my chosen instrument, Mr Hargraves, *succeeded in proving* mine, is it now too presumptuous on my part to refer the illustrious predictor to previous theory? May I be permitted on this one-subject to meet so distinguished a personage as Sir Roderick Murchison upon an equal footing, and while humbly bowing to his superior science, claim an equivalent counterpoise in actual comparisons and examinations in Australia, as well as in practical knowledge of gold deposits already acquired at the time when I sent to the colony a written letter and verbal instructions in the person of Mr Hargraves?

Sir Roderick Murchison dwells with emphasis on his having foretold that the greater development of gold always appears on one side or the other of the Cordillera in all important gold-producing countries. The Russian gold-fields of the Ural are chiefly situate on the *eastern watershed* of the meridional mountain chain—the gold-fields in California are on the *western slope*—on which side, then, ought it to have been concluded, *à priori*, that the gold-fields in Australia should be most prolific? The reply given on more than one occasion by Sir Roderick Murchison, after the gold-fields had been developed, is, that he anticipated upon the interior watershed—yet mark the important exception—my late sheep station of Goodgood, where I sought so much for gold, is situate upon an *interior water*—it is upon the *western slope* of the Cordillera, while on the *same* parallel of latitude, owing to some freak in nature, the much greater development of gold occurs on *the opposite slope*—on the *eastern watershed* at the important gold-fields of Braidwood and Araluen. So that if I had, when resident at Goodgood, been thoroughly convinced of the correctness of this anticipation (upon which I believe Sir Roderick Murchison plumes himself even more than upon the abrasion-doctrine), the merely speculative proposition would have been of no service, but, on the contrary, would have tended to retard discovery as much as did the mistaken doctrine of the abrasion of quartz-veins.

The subjoined humorous sketch from the 'Argus,' relative to some diggings on Anderson's Creek, near Melbourne, is appropriate to this subject:

As these diggings have become a subject of conversation, and therefore, it may be presumed, of interest, perhaps a line or two may be acceptable to your readers.

Originally, as I am informed, a prospecting shepherd discovered gold in small quantities on the creek, but the diggings are now confined to the banks of the Yarra, into which the creek flows, and a few "gullies" or water-courses leading thereto. Gold is found on both sides of the river. The river is intersected with bars of slate-rock running pretty nearly north and south, the course of the river at this spot being about east to west. The slate-bars dip into the shallow bank and rise in the opposite hill. The object of the diggers in sinking on either side is to "bottom," as they call it, on the slate, which, when broken up and washed, yields small particles of gold.

Whether gold exists in larger quantities at a greater depth is not known, and cannot be known without a trial. Geological science is said to be against such an inference, but I am inclined to go with those who receive the dogmas of geologists with the very greatest respect, but with very little reliance upon them. I know of no theory thoroughly reconcilable with the varieties of the facts which present themselves; and although science does indicate that certain general features in a country may be taken to evidence the existence of gold in that country, yet science does not infallibly direct us to the nuggets, nor tell us where they are.

Many years ago I was fortunate enough to cruize in a small vessel with a captain of whose attainments in the science of navigation I had been taught to entertain the profoundest reverence. After knocking about for some time in Bass's Straits, without any particular knowledge of what we were doing, I timidly inquired of our captain where we were. He produced a Goldsmith's geography containing a map of the world, and after confusing me by sundry complicated evolutions, performed with a pair of scissors, as the representative of a pair of compasses, he dabbed his huge thumb down on the map and exclaimed, "There, my lad! that's just the ship's position at noon this day." I was delighted with the precision of his intelligence, and although, somehow or other (I believe it was the fault of the wind) we ended our voyage by returning to the port from whence we came, I was impressed with greater admiration for scissors than I had entertained before. But when I got home and leisurely looked at my Goldsmith, I discovered that the square which the worthy captain covered with his thumb, by way of showing the ship's position at noon, not only included the whole of Bass's Straits, but likewise an area greater than New Holland and Van Diemen's Land united; and, in the backward state of my navigation, I confess to having questioned whether the captain's science and scissors had worked out an altogether satisfactory solution of my very simple question "Where are we?" I refer to this incident for the sake of exemplifying the position in which science leaves us unfortunate diggers.

Years ago Sir Roderick Murchison delicately ran his finger over a chart of Australia, and wrote, "Here is gold;" but where was it? Somewhere in New Holland! Mr Hargraves found it not by the assistance of science, but from the common faculty of comparison. Because he had seen the Californian gold-fields, he thought gold existed in New South Wales, and he searched for it and found it. This is the practical experiment which ought to be resorted to in this country, at the public expense, wherever gold is found to exist in such form and quantity as at Anderson's Creek. I would back the spade and the pick as a discoverer of gold against all the reports of all the geologists in the colonies. Heretofore the digger has been almost the sole discoverer of gold-fields; and when successful, the Government steps in with its tax, its commissioners, and its mismanagement. Surely a higher purpose would be to take practical steps to ascertain, and not merely to theorise upon, the extent to which available gold-fields exist. Science is of little practical avail if it carries us to a deduction, and no further. I maintain that many no doubt rational inferences as to the existence of gold should be followed by an attempt to prove them true, the funds for that purpose to be provided out of the territorial revenue, as by that means we should ensure a far more speedy development of the extent of Australian riches. Anderson's Creek has not yet been fairly tried; and if gold does exist in abundance at a greater depth than has yet been penetrated, why is the task of ascertaining the truth to devolve upon the chance, enterprise, or speculativeness of individuals, when the importance of such discoveries is of national concern? A geologist of good attainments, and not too much under the influence of preconceived opinions or theories, would, I am persuaded, by such a thorough practical examination of the gold-fields of Australia, render valuable aid to science by exploding many readily received errors, and establishing sounder principles in reference to the origin of gold, and its dispersion or accumulation in various localities. To diggers who possess very little knowledge of the science of geology, beyond general ideas of the supposed indications of gold, the anomalies are far more striking than the truths of science.

For instance, I have just sunk a hole on the banks of the Yarra, twenty feet in depth. In so doing, we passed through no fewer than eleven distinctly marked and totally different strata of earths and rocks, coming at last to the bed of slate. With the exception of the surface soil, and a stratum of clay, every stratum lying under them was found to contain gold, though in very small quantities; but the detached portions of quartz rock found in course of our sinking contained no visible gold at all, nor did any of the other water-worn stones. This is the case in all instances here. No speck of gold, so far as I have been able to ascertain, has been found in the quartz, but the received notion is that the quartz formed the original matrix, from which the gold has separated. We found, however, that through three beds of stones and gravel water percolated, which, when exposed to the atmosphere, emitted a peculiar gaseous odour; and the question which occurs to me is, whether the water does not contain a gas which acts as a solvent to the gold, and causes it to combine in small particles, such as we find it. If there be any foundation for such a supposition, how simplified the subject becomes! For knowing that gold is one of the most universally prevalent of all metals, we have only to conceive the presence of a subterraneous gas operating as a solvent, to account for the gold being brought into a state of visible presence, according to the strength of the solvent and the time of its operation. The small specks we found in a dishful of earth might have been blended into a small nugget by the action of a stronger solvent, and so the large nuggets found at Ballarat may, by a similar, but more powerful or longer continued chemical action, be the result of solvents of this nature. This principle would do away with a great deal that is absolutely incredible about the separation of small particles of gold from a common matrix, and their transportation for hundreds, ay, thousands of miles by the agency of water, and the disintegration of rocks.

If a cause more local be discovered to account for the presence of masses of gold, science will have gained in simplicity more than it will lose by diminishing the stupendous operations of nature which geologists delight to contemplate. The gas whose agency I suspect is chlorine, the best solvent of gold; and if that gas be detected in the holes of Ballarat or any other diggings, I imagine that it will place the geologist on the high road to many useful scientific discoveries, and may lead to a definite theory in entire accordance with facts which at present constitute irreconcilable anomalies between science and nature.

A spirit of fairness requires that the subjoined biography should follow the speech of Sir Roderick Murchison, so that both parties may enjoy that share of honour in public estimation which is relatively due to them. The occasion of its appearance was the publication of an offer from the Government of a neighbouring colony to the Rev. Mr Clarke of the appointment of geological surveyor in Tasmania, at a salary of 600*l.* per annum, which, on the ground of ill health and physical inability, he felt it a duty to decline; the Editors of the 'Sydney Herald,' in a leading article, then availed themselves of the opportunity to express as follows the high sense entertained of the personal worth and the scientific attainments of THE REV. W. B. CLARKE.

We have long desired to put upon record our idea of those services of which we have a tolerably accurate knowledge. The discovery of the first workable gold-field reflected high honour on, and brought substantial rewards to, the fortunate person who proclaimed that discovery. No one could desire to detract from his merit, or to lessen in public estimation the value of his labours. It will not diminish this honour to assign due merit to scientific men who, able to read the page of geology, have interpreted its contents to the scientific world. Among these Mr Clarke deserves a very conspicuous position.

Mr Clarke is a clergyman of the Church of England, and as such occupies the ecclesiastical parish of St Leonards. In 1849 an application was made to him to undertake a general geological survey of this colony. This he thought proper to decline; but when in 1851 a new appeal was made to him through the late Bishop Broughton to assist the Government in the emergency which had arisen, he was induced to lay aside his parochial duties, although not his functions as a clergyman. At the express request of the Bishop he traversed those parts of the colony which were marked out for special examination, and at his own request, as we understand, he received a commission from the same authority to exercise his ministry whenever an opportunity should occur. Thus, while as a geologist he was welcome to the miners, he did not fail to perform his duties as a divine whenever opportunities occurred. Insinuations, of course, were circulated against a clergyman who seemed to depart from the ordinary line of the clerical office, but what claim could have been more direct and sufficient than one conveyed to Mr Clarke by his diocesan and at the request of the Government under which he lived? We are not at all inclined to reflect upon the popular prejudice against the deviation of clergymen from their profession. It sometimes occurs, however, that, driven by an overruling constraint, clergymen have recourse to literature for their bread, and the censorious world is disposed to reproach them for doing anything but pray and preach. Events, however, show that they have powers more useful when employed in the service of the pen than of the Church, and what was originally a necessity becomes a high and important vocation. There are other instances in which the special attainments of men mark them out for their peculiar work. Will any one affirm that the Jesuits of old, who added so much to the scientific knowledge of the world, were wrong in cultivating their peculiar aptitudes? That Dr Priestley—almost the father of the science of electricity—was not more beneficially employed in his laboratory than in his pulpit? That Dr Livingstone was wrong when, finding an opening and feeling the courage to pursue it, he abandoned the teaching of the alphabet and the elementary instruction of a few demi-savages, in order that he might resolve a great geographical problem with which his name will be ever associated, and open to millions the paths of science and the doctrines of peace? Just so with Mr Clarke, who, possessing peculiar adaptation for a work of great importance, yielded to the importunities of men who had a right, if not to command, at least to request, his assistance.

Mr Clarke commenced the study of this interesting science as early as the year 1817, under Dr E. D. Clarke, the great traveller, and Professor Sedgwick. This was not a mere study of books, but a personal examination of the most celebrated formations of Europe. He travelled extensively in England and Wales, and on the Continent, from 1820 to 1839, not omitting a single year. In 1820 he visited the Lake district of Westmoreland and Cumberland, and the Isle of Man; in 1821, the coal-fields of Staffordshire and Derbyshire; in 1822, the Lake district and North Wales; in 1823, the chalk and oolitic and tertiary districts of Yorkshire and Lincolnshire; in 1824, the chalk districts of Sussex and Normandy; in 1825, the central and southern parts of France, the Alps, and the north of Italy; in 1826, the Netherlands; in 1827, the Netherlands, the Rhenish Provinces, Prussia, and Holland; in 1828, Belgium, and the Ardennes, and the tertiary districts of Nassau; in 1829, the volcanic districts of the Rhine and Moselle, completing also a survey of the counties of Suffolk, Norfolk, and Essex, commenced in 1827; in 1830, the chalk districts and older formations of the frontiers of France and Belgium; in 1831, Dorsetshire and the West of England; in 1832, Dorsetshire and the Isle of Wight, Sussex, and the South-west of England; in 1833, the coal-beds, &c., of the Boulonnais; in 1835, the north of France; in 1836, the Channel Islands and the Isle of Portland; in 1837, the new red sandstone districts of Staffordshire, Cheshire, and Lancashire; in 1838, the Silurian old red sandstone and coal districts of Shropshire, Herefordshire, and Monmouthshire, and South Wales; and in 1839, the colony of the Cape of Good Hope. Besides these regular explorations other journies were taken to interesting localities.

We have noticed these particulars to show that Mr Clarke's attainments in science are not such as amateurs who work upon cases of specimens and confine themselves to books may be supposed to possess. Men only who have looked at Nature herself in her wonderful developments, who have been enabled to compare one district with another,—to see what is uniform and what is special and various,—can from these multitudinous objects generalise into order and become the teachers of science. No man could have undertaken journies so numerous and so laborious without having the enthusiasm for his vocation in constant activity, and no man with the intelligence of a scholar could prosecute this extended survey without acquiring great knowledge and precision. It was fortunate for a new country like ours that, at so little expense, the highest qualifications could be brought into its service, and it is disgraceful, after that service is rendered, to depreciate its worth and to refuse honour where honour is due. It has not been merely in the acquisition of knowledge that Mr Clarke has distinguished himself. Before his arrival in this colony his labours were known and recognized. In D'Archiac's 'History of the Progress of Geology' honourable mention is made of his contributions on geology, and for a succession of years papers from his pen appeared in scientific works, the enumeration of which would require a catalogue—combining almost all the topics within the range of geological inquiry. Many of these are found in the 'Magazine of Natural History' and the 'Transactions and Proceedings of the Geological Society.'

Since his arrival in this colony Mr Clarke has been most laborious in his contributions, which are now circulated through the scientific world. His reports to the Government of New South Wales have been revised and abstracted by M. Delesse, in his tract 'Sur le Gisement et sur l'Exploitation de l'Or en Australie.' The respectable publication issued by the Royal Society of Tasmania was enriched with many papers contributed by Mr Clarke, and it is to be regretted that they are not published in a more convenient form, relating as they chiefly do to the geological phenomena of this country.

In 1857 Mr Clarke visited Tasmania, but from ill health he was not able to effect more than a cursory investigation. The reports which he furnished were, however, published in the Blue Books of that colony for 1857, and we presume their value has suggested to the present Executive the propriety of inviting his more permanent labours.

Mr Clarke has not received due credit in reference to the discovery of gold in Australia. Sir Roderick Murchison, the eminent geologist, gathered from facts which came to his knowledge that gold would be found in New South Wales, and made a communication to the British Government to that effect; he has therefore the priority of European communication. But in 1841 Mr Clarke found gold to the west of Hartley, under Stoney Range, and near Green Swamp, and in 1843 he first communicated the fact of the existence of gold in Australia, to Sir George Gipps. Sir George enjoined him to silence, having an impression that the discovery would be pernicious.

The proofs of priority in discovery were laid before Viscomte

D'Archiac, the editor of a geological work published under the auspices of the French Government—who pronounced that the proof was undeniable of his right to the priority of the discovery of gold in Australia. [" J'ai reçu avec beaucoup d'intèrêt la preuve irrecusable de votre droit à la priorité de la découverte de l'or en Australie, découverte qu'il n'etait guère possible de vous contester de bonne foi."] This discovery, made in the light of science, assures us of the certainty of its inductions, and opens a brilliant prospect for the future. We no longer depend upon luck, but, led over the surface of the earth by guides whose skill is the result of infinite toils, we witness wonders such as the magicians of past ages never pretended to perform.

In 1851 Mr Clarke published a pamphlet on the gold-fields of this and the neighbouring colonies. In this he first pointed out the auriferous regions afterwards of world-wide celebrity. The Gold Committee appointed by the Victorian Assembly did ample justice to the geological fame of Mr Clarke, and a gratuity was voted to him by the Legislature of 1,000*l.*, of which, to its immortal shame, the greater part remains unpaid to this day.

Mr Clarke has pointed out to the Government of this colony more than 100 gold-localities. Some of them are already famous. These researches extend from 38° to 28° south—upwards of 700 miles. The gold-field of New Zealand was sought in consequence of information contributed by Mr Clarke. Such a series of successes rarely falls to the lot of any man of science. They secure to him distinct and imperishable claim to the gratitude of the colonies, and that without lessening the merit of any who have been co-labourers in the same field, or who, under some lucky star, have stumbled upon a splendid prize.

The sum of 1,000*l.* was voted to Mr Clarke by the Government of New South Wales—in consideration of reports contributed at various times—rather to indemnify him for expenses he incurred than as a recompense for his geological researches.

When, however, we consider how gold has been since found—at how many spots—how near to the surface—entangled in the roots of trees—under-lying grass—thrown up in excavations—we can only express our amazement that it was not at a much earlier period among the most precious exports of the colony. Not that we imagine that this direction of colonial industry would have been so beneficial in the long run; time was required to prepare this country for the extraordinary developments of the last few years.

Part Tenth.

MR HARGRAVES'S NARRATIVE OF DISCOVERY AND MR HOWITT'S CRITIQUE ON THEORIES.

THE book already mentioned, on 'Australia and its Gold-fields,' recently published in England by authority of Mr Hargraves, reached the colony about the same time with another from the pen of William Howitt, describing his experience on the Victorian gold-fields. The preceding controversy on the origin of alluvial gold, in which I had gained the assent of one or more anonymous writers to the leading facts of the written theory which I had previously furnished to Mr Hargraves, had appeared in the interim in the local newspapers. My first two theoretical letters, addressed to Mr Hargraves, had attracted the notice of Mr Howitt during his residence in the colony, and this writer, after spending considerable time on the various gold-fields in Victoria, now in his book, with the sanction of his proper name, fully admitted the truth of many of the facts and inferences which the anonymous writers had in the interim hesitated to acknowledge with their names, although in an indirect manner admitting and consenting to the truth of them with all apparent earnestness and sincerity. The theory I had propounded Mr Hargraves appears, by the book in question, to have adopted and appropriated entirely to himself, as far as he seems to have understood it; but the conclusion alone is accepted by him—

there being an entire omission, and apparently an inappreciation, of the facts upon which the theory is based. The following extracts from 'Australia and its Gold-fields' contain Mr Hargraves's version of the gold discovery and developments, written some considerable time after he had obtained the money gratuities, and after he had ceased to be the Crown Commissioner for gold explorations.

The narrative of our joint explorations in California, from the time when I had left Wood's Creek and Mr Hargraves had followed me down to San Francisco, in 1850, is continued as follows at page 91 :

> In San Francisco I again fell in with my friend Mr Davison. It was agreed that we should try the Northern Diggings during the summer, but as it was as yet too cold to go north, we bought a small craft of about six tons burthen and determined to start at once, intending, if the snow prevented our progress onwards, to sell our cargo and return again to San Francisco.
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> Before leaving San Francisco I met with a gentleman with whom I had previously been slightly acquainted in New South Wales. He professed to be, and for all I know was, well versed in chemistry, geology, mineralogy, and other kindred sciences ; and, accompanied by his two sons, had brought with him a machine of a very expensive description (400*l*., I think, was its cost), for the purpose of extracting gold from the soil. I had heard of this machine before I left New South Wales; but its mode of operation had been kept a profound secret. It soon appeared, however, that the gentleman in question was practically as ignorant of the method of working for gold as I had been before I landed in California; and he did not hesitate to explain to me the nature of his machine and to ask my advice on the subject. Upon examining the machine I at once was convinced of its utter uselessness, and of the absurdity of my friend's dragging with him a machine of a ton weight, having as many brass cocks, screws, winches, and other complicated contrivances as would require the constant superintendence of a practical engineer, and which, after all, would not do one-half the work of an old packing-case converted into a cradle. This gentleman was sufficiently convinced by my observations to induce him to leave his cumbersome machine behind him, and to accept an offer which Mr Davison and I made him of a passage up the Sacramento River. . . . .
>
> We were now at Marysville on the Yuba, from 250 to 300 miles from San Francisco. We immediately landed, pitched our tent, and removed our effects into it. But as we could see the snow on the mountains north of us, and found that many others were waiting to go north, we considered that it would be better to retrace our steps, disposing previously of what stores we should not be in need of. This being agreed upon, while my friend Mr Davison proceeded to Foster's Bar, to instruct our friend already spoken of in the art of gold-washing, I stayed in charge of the boat. They both returned in ten days, when we sold the remainder of our flour, and set out again for San Francisco, which, having a strong current and wind in our favour, we reached in two days and a half.

I will not trouble the reader with the details of my subsequent devious course; I will only state, that later in the season we once more went in our boat to Sacramento and on to Marysville, whence I again returned to Sacramento City, to sell our little craft, which had been so useful to us. On this occasion I paid a visit to Suttor's Fort, which is situated one mile and a half from the river, and is a spot of great interest, in connection with the newly-discovered wealth and rapid rise of this country.

After relating the tradition, which he then heard confirmed, of a Mr Marshall, in the service of Captain Suttor, first finding near this place a few specks of gold when constructing a mill-race, Mr Hargraves continues to narrate:

Now, amongst the newly-arrived emigrants, there happened to be an old Georgia gold-miner, who, when he heard of the discovery, hastened off with others to the spot, made a cradle, and set to work. Many others did the same. Thus commenced gold-digging in California. The Georgia miner taught the people in the first instance how to obtain the gold by washing, but for which, in all probability, notwithstanding what had been found of it, the story of its discovery might have passed away and become a mere idle tale, like that of the shepherd who found gold near Wellington, in New South Wales, thirteen years ago; for neither Captain Suttor nor Mr Marshall knew how to obtain it except by picking it up with their fingers.

After viewing the fort and surrounding country, I moved on towards the town, and thence onwards, by steam-boat, to Marysville again, and at length to the diggings at Foster's Bar, and to the forks of the Yuba. Here the throng of diggers was so great that we could not find a single vacant claim. All were engaged; and some that were not workable were changing hands at from 500 to 1,000 dollars each. This being the case, we were driven—meaning Mr Davison and myself—to start again in search of other diggings; and having heard a favourable account of the Slate Ranges, distant about eight miles from our present station Foster's Bar,—thither we accordingly moved, towards the latter end of June. Here we met with better success than had hitherto attended our efforts, getting about two and a half ounces daily between the two. But the greater our success was, the more anxious did I become to put my own persuasion to the test, of the existence of gold in New South Wales. So—having stayed at Slate Range as long as the weather would permit, that is, until the beginning of the following November—we returned to San Francisco for the last time. In a few days afterwards I set sail for Port Jackson in the barque Emma, Captain Devlin, bent on making that discovery which had so long occupied my thoughts, and reached that place early in January, 1851. My friend Mr Davison remained in California, but promised to follow me when I had actually proved the correctness of my assertions as to New South Wales being a gold country; and this he has since done.

In the next chapter (iv), Mr Hargraves, in proposing to give a succinct history of the discovery of gold in Australia, thus commences:

In so doing it would be far more satisfactory to me if I could feel myself justified in confining my remarks chiefly to my own share in that discovery, leaving to others to settle among themselves their conflicting claims, upon scientific grounds, in regard to that discovery—claims which in no way interfere with mine, which touch alone the practical result. But this I cannot do; a history of gold discoveries, whether those in California or Australia, being obviously incomplete, unless some attempt be made in it to award honour where it is due, and to strip the pretender of his borrowed plumes to which he has no right.

I have all along disclaimed any pretensions to scientific knowledge. Without any knowledge whatever of the science of geology, I simply compared, in my own mind, the geological formations which I saw in California with others that I had seen in Australia eighteen years previously; and, becoming fully persuaded that if the existence of gold was to be tested by such outward appearances, gold must exist in Australia as well as in California, I acted on that persuasion, and, as will be seen in the sequel, at the very first trial discovered the existence of gold where I had imagined it to be, and in an alluvial form. That important discovery I immediately communicated to the Colonial Government and the public generally; the immediate result of which was, the opening out and working of mines of enormous productiveness in various parts of that country.

Several years, however, before this practical discovery took place, the existence of gold in Australia had been confidently prognosticated by Sir Roderick Murchison; and since my discovery the Rev. W. B. Clarke has laid claim to the honour of having made similar prognostications long before Sir R. Murchison. This gentleman, though he does not deny Sir R. Murchison's entire independence and originality of views, yet puts his own claims forward with such pertinacity, that if they be considered well grounded, his rival's share in the honours due must be but of trifling import, seeing that in all scientific discoveries, as well as in all mechanical inventions, the second discoverer must always yield the palm to the first.

Sir Roderick Murchison himself has thought it worth while to remonstrate with the English Government for having omitted all mention of his name in the published Parliamentary Report of the Gold Discovery. *That Report was drawn up by Mr Clarke;* who, in answer to Sir R. Murchison's complaint, says that he had made "*silent mention*" of him. Silent mention indeed! If there was to be any silence in the case, it surely would have been more becoming had Mr Clarke made only silent mention of himself, and given to Sir Roderick Murchison the meed of praise to which he is so justly entitled. However, I will not anticipate conclusions; I will set forth the simple facts as alleged by each claimant, and suggest what appears to me to be the only just conclusion, from a consideration of their several statements.

And first, of the claims of Sir Roderick Murchison. In the year 1844 that gentleman instituted a comparison between the rocks of Eastern Australia—numerous specimens of which had been brought home by Count Strzelecki—and those of the auriferous Ural Mountains, with which he was, personally, well acquainted. His observations upon this comparative view were printed in the same year (1844) in the Journal of the Royal Geographical Society. This, then, was the first *published* declaration of opinion that gold must exist in Australia. Again, at the anniversary meeting of the Royal Geological Society of

Cornwall, held at Penzance in the year 1846, Sir Charles Lemon, the president, in the chair, Sir Roderick Murchison made an address upon the same subject, in which he urged the superabundant Cornish tin-miners to emigrate to the colony of New South Wales, and there obtain gold from the alluvial soil in the same manner as they extracted tin from the gravel of their native country. Again, in the year 1846, when some specimens of Australian gold ore were sent to him as an authority on the subject, he, on the 5th of November of that year, addressed a letter to Earl Grey, then Secretary for the Colonies, stating his views as to the existence of rich gold-fields in the colony. From all which Sir Roderick justly infers, that as his memoirs of 1844 and 1846 are anterior to any other printed documents relating to Australian gold, so he was the first person who wrote to her Majesty's Government on the actual discovery of specimens of native ore, and who urged that a well-regulated search for it should be instituted, not as a crude speculation or matter of guess work, based merely on theory, but as the direct result of inductive reasoning, founded upon facts and extensive geological observation. Such are the grounds on which Sir Roderick Murchison's claims to be the first scientifie discoverer of gold in Australia rest.

Let us now see what are Mr Clarke's pretensions. As the foregoing summary of Sir R. Murchison's claims has been taken from a letter of his to the Colonial Secretary, bearing date July 8th, 1853, so it is but just to take Mr Clarke's account of his own pretensions from his answer to that letter, addressed to the Colonial Secretary of New South Wales, and dated the 21st of December, 1853. After disclaiming any desire in the slightest degree to diminish the value which Sir Roderick Murchison assigns to the dates of the printed documents above alluded to, and likewise disclaiming any desire to depreciate the importance of his communication to Earl Grey in 1848, Mr Clarke proceeds:

"But I trust I shall be allowed to claim equal value for my own communication to his Excellency the late Sir George Gipps, on the 9th of April, 1844, to members of the Legislative Council of this colony in the same year, and to other residents in this colony two years before, respecting my own anticipations of gold, which were derived, not from such comparisons with the writings of Sir R. I. Murchison as that gentleman has mentioned, but from my own observation of the geology of New South Wales, and *from personal discovery in* 1841 *that its rocks are auriferous*. Without, then, wishing in any way to detract from the independent merits of my illustrious friend, or to deny the advantages in maturing my opinions which I may have derived from his accomplished studies and extensive researches in Russia, I desire finally to record here, that the only claim I have hitherto preferred is, to have been the first person in Australia who announced, generally, as indicated upon geological principles combined with personal experience, that it is a rich auriferous region; and I do not conceive that, in common justice (as respects any claim advanced out of the colony), this will be denied; for it is utterly impossible that any information from any other writer could have been obtained by me in 1841, or that in 1844 I could have profited by the publications of Sir Roderick, especially from those which I have not seen between 1844 and 1848. I rely on the candour of the Governor-General to permit this vindication of my right to be considered as having been connected with the question of gold in Australia from the year 1841, to be placed on record in connection with the just claims of Sir Roderick Impey Murchison, as the anticipator and the predictor of gold in Australia from the earliest period to which he bears testimony."

* * * * *

I believe I am right in stating that, as far as history teaches us, the discovery of gold, from the earliest ages to the time of its discovery in California, has always been accidental. But in this case, even before the discoveries in California, Sir Roderick Murchison declared, guided only by the light of science, "I can tell you where gold must be found." Do Mr Clarke's pretensions in any, the smallest degree, approach this point? He finds by accident a bit of gold—he reads about gold countries—he talks of his bit of gold—but he does not show the slightest trace of having made any scientific deduction whatever upon the subject!

Again, when in consequence of the discovery of gold in California, New South Wales was so nearly stripped of her labouring population, that it was in contemplation to prevent the departure of emigrants by legislative enactment, why did not Mr Clarke make known his theory, however vague or inchoate, to the Government, in order to its being turned to account in an explicit form in so important a crisis? The gold-fields that he had himself passed over in 1841 were within 120 miles of Sydney. It is idle to suggest, as Mr Clarke does, that the penal condition of the colony made it advisable to keep the matter a secret; for immediately on my making known my discoveries to the Colonial Secretary, an adequate reward was promised me, if my story proved to be true; for at first it was listened to with some incredulity.

On the other hand, if Mr Clarke, with his established reputation as a geologist—(he had before this, I may observe, been voted a sum of money by the Legislative Council, to assist him in publishing a work on the geology of Australia)—if, I say, Mr Clarke had taken those steps in New South Wales which Sir R. Murchison had done ineffectually with the Home Government, there cannot be a doubt that he would have had abundance of aid granted him; and one day's exploration at the gold-fields—the very gold-fields which he had himself crossed ten years before—would have removed all doubt on the subject.

The earliest rumour we hear on the subject bears date so far back as the year 1788 or 1789, very shortly after the country was first colonised. A convict stated that he had found a piece of gold immediately on the shore by Port Jackson; but a guard being sent with him to the spot, in order to make him verify his statement, he failed to do so, and received 150 lashes as an impostor. Many years later, when the road over the Blue Mountains to Bathurst was being made, several convict labourers are said to have picked up small pieces of the precious metal; but it was thought necessary, for the maintenance of discipline, that a search for it should be discouraged, and therefore any one who professed to have found any gold was instantly punished. The fact itself (if it be one), however, was kept so secret, that it did not spread abroad until after my discovery. Of its truth, however, I can see no good reason to doubt; because small pieces of quartz, containing gold, have since been found in various parts of these very roads, after descending Mount Victoria. Then we hear of Mr Clarke having fallen in with a pennyweight of gold in quartz, in the year 1841, already treated of at some length. Subsequently to this, a shepherd named Macgregor, who lived in the Wellington district, seems to have been so fortunate as to find a considerable quantity of gold in quartz rock, which he from time to time took to Sydney, and sold to a jeweller there. He was, however, evidently ignorant of the extent of treasure with which he was surrounded, and was equally ignorant of the character of alluvial gold; but of him I shall have more to say presently. Besides these, a Mr Smith, in the year 1846, offered the Colonial Government to divulge the existence of a gold mine, if an adequate reward was secured to him. He received the same answer as myself, that he should be rewarded according to the extent and value of the discovery, but with this he was not satisfied. My own persuasion is, that he did not know of any gold-fields at all, and that even if he did believe in the existence of gold in any quantities, he knew not how to search for it in alluvial soil; the probability is, that by some means or other he learnt of Macgregor's good fortune in finding lumps of gold in the quartz, and acted on this hint—for on any other supposition it is not credible that, a poor man as he was, he would have neglected the opportunity of securing an ample fortune, which he could readily have done had he the information he pretended to, by working the gold in the lonely valleys of the Turon, a retired spot where he would run but little risk of being interrupted by his fellow-man in those days.

From these statements, Mr Hargraves proceeds to give the particulars of his own discovery in the following narrative:—

I have already in a former chapter stated my reasons for believing in the existence of gold-fields in New South Wales. It was with an anxious heart, therefore, that I again landed at Sydney, in the month of January, 1851. On my passage thither and immediately on my arrival, I made known to my friends and companions my confident expectations on the subject; one and all, however, derided me, and treated my views and opinions as those of a madman. Still undaunted, on the 5th of February I set out from Sydney on horseback, alone, to cross the Blue Mountains. On the first day I reached Penrith, a distance of about thirty-three miles on the western road. With the exception of a small patch of whinstone formation, at a place called Prospect, the country was as uninteresting and barren as one would desire to travel through.

On the following morning I resumed my journey, and before five o'clock ascended the pass of the Blue Mountains. These, at a distance, have a grand and imposing appearance, but when one reaches their summits they become almost insignificant, and are scarcely to be equalled for sterility.

After crossing these mountains, I descended into the Vale of Clwyd. Gold may be found here in many places, but not, I believe, in sufficient quantities to remunerate the labourer at the present price of wages in New South Wales.

The country now becomes more inviting and habitable than during the preceding forty miles. Inns had been established at distances varying from ten to eighteen miles, for the convenience of squatters travelling towards Sydney from the interior; but, at the time I am speaking of, the innkeepers, one and all, complained sadly of the poverty of the squatters generally, whom they represented to be so badly off that they could not bear the expense of stopping at their houses, but commonly camped in the bush. I attempted to console one of these complainers, a Mr Wilson, host of the Blue Mountain inn, by telling him that I had just come from California to make a change in New South Wales, and that he would soon have more customers than he would be able to accommodate. Of course he only laughed at me. But, on a subsequent visit to the same district, Mr Wilson happened to recognise me; and having found my promise more than fulfilled, set out for my entertainment a lunch of no ordinary character in that part of the country, fed my horses, and resolutely refused to receive any payment—a compliment which the then state of my finances made not unacceptable.

On the third day I reached Bathurst, and resumed my journey on the following morning, purposing first to visit Coombing, the residence of Mr Icely, M.L.C., to whom I had a letter of introduction, and who had promised to facilitate my views, and render me any assistance in his power. I however met Mr Icely on his way to Sydney. I then determined to visit Guyong, where I had been eighteen years before, and the neighbourhood of which I believed to be auriferous. I attempted to make a cross cut through the bush, and having travelled about eight or ten miles at nightfall, found myself on the Wellington road to the west instead of the north. After groping about in the dark for an hour or two I found myself at Frederick's Valley, a district which has since become famous for its auriferous wealth. There I spent the night, and on the next day, the 10th of February, reached Guyong.

The landlady of the Guyong inn, Mrs Lister, had seen better days. I had known her during her husband's lifetime. She was now a widow. It occurred to me that I could not prosecute my plans efficiently without assistance, and that Mrs Lister was a person in whom I could safely confide, and she would probably furnish me with a guide and all the necessary implements. After dinner, therefore, I disclosed to her the object of my visit, and begged her to procure a black fellow as a guide to the spot I wished to visit first; for though this part of the world was many years back pretty well known to me, it is a matter of no small danger to attempt to penetrate alone the dense forests that cover the whole surrounding country. She entered with a woman's heartiness into my views, and offered me the assistance of her son, a youth of about eighteen years of age, who, she assured me, knew the country well. He was, therefore, made acquainted with my object, and, at my request, provided me with the requisite tools—a small pick, a trowel, and a tin dish for washing the soil.

After resting one day at Guyong, on the 12th of February I started thence, accompanied by young Lister. Our course was down the Lewis Ponds Creek, a tributary to the Sumner Hill Creek, which again is a tributary of the Macquarie River. After travelling a distance of about fifteen miles, I found myself in the country that I was so anxiously longing to behold again. My recollection of it had not deceived me. The resemblance of its formation to that of California could not be doubted or mistaken. I felt myself surrounded by gold; and with tremulous anxiety panted for the moment of trial, when my magician's wand should transform this trackless wilderness into a region of countless wealth.

Still one difficulty seemed to present itself. There had been an unusual drought during the summer, which was now drawing to a close, and the creek, where we then were, was completely dried up. My guide, however, in answer to my inquiries, told me that we should find water lower down, so, following its course, we soon fell in with some rocks which contained a sufficient supply.

We now turned out our horses, and seated ourselves on the turf, as it was necessary to satisfy the cravings of hunger before I ventured on my grand experiment. Had that failed, but little appetite for food would have been left me.

My guide went for water to drink, and, after making a hasty repast, I told him that we were now in the gold-fields, and that the gold was under his feet as he went to fetch the water for our dinner. He stared with incredulous amazement, and, on my telling him that I would now find some gold, watched my movements with the most intense interest. My own excitement, probably, was far more intense than his. I took the pick and scratched the gravel off a schistose dyke, which ran across the creek at right angles with its side; and, with the trowel, I dug a panful of earth, which I washed in the water hole. The first trial produced a little piece of gold. "Here it is!" I exclaimed; and I then washed five panfuls in succession, obtaining gold from all but one.

No further proof was necessary. To describe my feelings at that eventful moment would be impossible. What I said on the instant—though, I must admit, not warranted as the language of calm reflection—has been since much laughed at. And though my readers may renew the laugh, I shall not hesitate to repeat it, because, as it was the natural and impulsive expression of my overwrought feelings at the moment, so is it the only account I can now give of what those feelings were.

"This," I exclaimed to my guide, "is a memorable day in the history of New South Wales. I shall be a baron, you will be knighted, and my old horse will be stuffed, put into a glass-case, and sent to the British Museum!"

At that instant I felt myself to be a great man. I was as mad, perhaps, at the moment, as Don Quixote was his life through; and, assuredly, my companion was as simple as Sancho Panza, for the good youth afterwards told me he expected I should obtain for him the honour I had promised.

On our return that night to the inn at Guyong, I wrote a memorandum of the discovery, which I afterwards gave to the Colonial Secretary, as a memorial of the great event.

More, however, was to be done before I could make public my discovery. It was necessary to ascertain over what extent of country in that district the same formation prevailed, in order to arrive at some notion of the probable extent of the gold-fields.

Accordingly, I resolved on visiting the Macquarie River. My guide not being acquainted with that country, recommended to me a youth by the name of James Tom, to whom likewise I was under the necessity of divulging my secret, and making known my first discovery. He accordingly took Lister and myself about eighty miles, where we fell in with the Macquarie River.

The country in this neighbourhood was very flat, and no rocks were visible. But we were then in sight of what have since become the extensive Bunandong diggings. The appearance of everything around promised well. We pursued the bed of the river, the stream of which was at the time running very sluggish. It was in many places only a few inches deep, in others were deep holes; and when the banks closed in the rocks were visible, consisting of compact schists, traversed by quartz veins, threads, and trap-dykes. Here again I satisfied my self of the auriferous character of the country by actual trial, and did so frequently all the way up to the point of my first discovery.

On ascending the table-land from the Macquarie, the Turon mountains became visible in the distance, and, as far as could be discerned, they gave every appearance of being auriferous. After seven or eight days spent in this way we returned to our starting-point, I being fully satisfied that there existed an extent of at least seventy miles of auriferous land in the part of the country I had traversed.

Rumours, however, had been some time prevalent (and to which I have already alluded), that an old shepherd named Macgregor had picked up gold in the Wellington district, which was at a distance of about 100 miles from the spot where I then was. I therefore despatched my two young companions to examine the Turon, and, providing myself with a fresh horse, bent my course to the house of a friend, Mr Cruikshank, a squatter, settled at Dubbo, on the Macquarie River, in the neighbourhood of which I knew Mitchell's Creek—which I wished to visit—to be.

I had no hesitation in making known to Mr Cruikshank the object I had in view. Like others, he listened with incredulity; but his good lady was more sanguine. So, on my asserting that I felt sure we could find gold—fine, probably, and in small quantities—at their very door, we all three started to the river with a tin dish and spade; and sure enough the first pan of earth produced gold. Mrs Cruikshank naturally took great interest in the discovery, and after a few hints from me, set to work with the prospecting-pan, and immediately found gold; encouraged by which she expressed her intention of resuming her work, and procuring enough to make some rings.

I then proceeded to Mitchell's Creek, under the guidance of a native black fellow, whom Mr Cruikshank provided for me. It was not difficult to discover where the old shepherd procured his gold, though he had not touched the alluvial soil. I returned by nearly the same route, observing as I rode along a good deal of promising country, which has since proved to be very productive, when there is water sufficient to wash the soil.

In the meantime my two former guides, Lister and James Tom, had returned home, bringing with them some fine gold from the Turon, which from its character held out prospects of an abundantly rich field.

My chief anxiety now was lest some miner from California should make a similar discovery, and forestal me with the Government. I therefore determined to proceed at once to Sydney, and put myself in communication with the Colonial Secretary. Before starting, however, I instructed my guides how to make a proper cradle, and in the mode of using it. In about four days I reached Sydney, and put myself in communication with Mr E. Deas Thomson, the Colonial Secretary; told him I had discovered an extensive gold field, and showed him some fine gold, the produce of the country.

Mr Thomson evidently doubted the truth of my story, and remarked that it was very strange the Government geologist had not found it, if it existed in natural deposit, as I represented. I told him I had come from California for the purpose of making the discovery, and there it was. I added that I believed the fields to be as rich as those of California; but that I expected to be rewarded for the discovery in a measure commensurate with its importance to the Government and the country at large.

By this gentleman's advice I called upon him the next day, when, after a lengthened interview, he requested me to communicate with him in writing, and state the terms on which I was willing to point out the gold fields. He added, "if this is a gold country, Mr Hargraves, it will stop the Home Government from sending us any more convicts, and prevent emigration to California; but it comes on us like a clap of thunder, and we are scarcely prepared to credit it."

On the succeeding day I addressed the following letter to Mr Thomson. [This letter and Mr Thomson's reply is already printed at page 86].

Having accepted the terms proposed to me, and entered into an agreement with the Colonial Government, and having received my final instructions, I was anxious to draw public attention to my discovery, and induce as many persons as possible to set about digging for the precious metal. To this end I proceeded at once to Bathurst, and everywhere, as I went along, I made known the fact of my discovery. From Bathurst I proceeded to meet Mr Stutchbury, the Government geologist, and went with him, accompanied by about thirty-seven horsemen, to Summer Hill Creek, at the junction with Lewis Ponds, a little below my first discovery.

At this spot we found the young man Tom and his brother at work. I washed several pans of earth in Mr Stutchbury's presence, as also some in the cradle, and fully satisfied him of the truth of my statements; and, on the spot, he gave me a certificate to that effect, to be forwarded to the Colonial Secretary. Before leaving, I gave several new comers instructions in the method of washing and using the cradles, and by the end of the week I should think about 10,000*l.* worth of gold had been raised on the spot; to which I had previously given the name of Ophir.

It had never been my intention, in connection with this discovery, to work for gold; my only desire was to make the discovery, and rely on the Government and the country for my reward. Many thought me very foolish in this respect, and some made me most liberal offers for my services, if I would point out claims, superintend working-parties, and buy gold on commission; but I resolutely refused every offer, and resolved from first to last not only not to accept any private remuneration, but not even to appropriate a grain to my own use.

When those who were working in the mines seemed to be sufficiently acquainted with the method of working, I returned to Sydney, and on my arrival there, found a proclamation had been issued, declaring that all gold found in natural deposit was the property of the Crown, and that all persons found digging for it would be visited with sundry pains and penalties. I had, on my first interview, recommended the Colonial Secretary to adopt a system of licensing, similar to that at first pursued in California, with regulations for working. This suggestion was adopted. Of the regulations themselves, which were made at various times, I shall speak on another occasion.

At an interview that I shortly afterwards had with the Governor, his Excellency offered me the appointment of Commissioner of Crown Lands, at the usual pay of 20s. per diem. But this I at first declined, on the ground that such a salary would be quite inadequate in a gold country. However, on being assured that by accepting the office, I should increase my claims to reward for the discovery, I felt bound to accept it; and accordingly started once more with one servant and a pack-horse for the land of Ophir, my business being to search for new gold-fields.

Before leaving Sydney I had received instructions from the Government to proceed immediately to Wellington, for the purpose of examining and reporting on a most important discovery of gold, alleged to have been made in that neighbourhood, in the matrix or parent rock. The exact locality was to be pointed out to me by Mr Brockstayn, a jeweller, with whom I was desired forthwith to put myself in communication.

I believed, and expressed my belief to the Colonial Secretary, that the supposed discovery was a mere delusion. I had already seen Mr Brockstayn, who told me a most marvellous story, and stated that ladders would be required to ascend the rocks where the gold was to be obtained. I well knew that there were no such rocks at Mitchell's Creek as would require the aid of ladders; but my objections were only met by a peremptory order to obey instructions and make my report.

In the month of June I accordingly met Mr Brockstayn at Wellington, and at once proceeded with him to Mitchell's Creek, a distance of about ten miles. It would require the pen of a Congreve, and the imitative powers of a Mathews, to re-enact the ludicrous scene that occurred between us on our reaching our destination.

On my asking my companion to what part of the creek he wished to go, he replied:

"Vell, I dosh not know; me not come here before to-day."

"What," said I, "haven't you been here before to-day?"

"No," said he. "You know," said he, "dish isht de vay it wosht—Macgregor got de gold long times ago, ten,—twelve—years ago, and sell to von Mr Cohen. Mr Cohen ish dead, and I marry de widder. Now, Mrs Brockstayn vosht one time, you see, Mrs Cohen; vell, den, my vyfe, you see, ven ve vosht married, tells me all about it—dis vay you see—dat Macgregor every time him comes to Sydney vid de sheeps, dat isht vounce a-year, alvays bringsht de gold and sells it you see to Mishter Cohen. Mishter Cohen sell two three pieces to Sir Thomas Mitchell, and Mishter Clarke the gemgoligist buy some too. Vell, ven you find de gold I tink I get good reward. You know I vun very poor man, and you makes vun good report. I not forget you; me got goot many little poys you see; I very poor."

It would be impossible to describe my disgust at having been brought upwards of 100 miles out of my route on such an errand. I had been at Mitchell's Creek in February, shortly after my first discovery, and had heard, on my way up, of Macgregor having found gold there. I knew he had obtained it from a quartz-vein, for Sir Thomas Mitchell told me he had bought such a piece from Mr Cohen in his lifetime. Mr Brockstayn showed me a similar specimen of gold in quartz which his wife had given him.

However, I had no help for it, but must do the bidding of my blind guide, who persisted in his story, saying, "I am shure dere isht gold in de place, what for my vyfe tells me dats de place vere Macgregor gets isht gold, and you can find it if you like."

I requested him to show me the place where the ladders were required, and I would at once climb the rocks and knock off as much quartz as would fill the gig in which we had ridden to the spot; but he had endless stories, and could say no more about it. My first wish was to leave him where he was, to find his way back to Wellington as be could; but, fearing he might lose himself in the bush, I reluctantly took him back to the place whence we had started.

While at Wellington, I received instructions to proceed to the Abercrombie river and report upon a discovery made there. On my way through the mountains I was much struck with the promising appearance of the country; it has not, however, hitherto proved so productive of gold as it appeared likely to be, though, I doubt not, when it has been more thoroughly examined, it will be worth the labour and cost of digging.

On arriving at the Abercrombie river, I found about thirty persons at work. Most of them had come from Goulburn, about 125 miles south of Sydney. They were novices in gold digging, and were, in some cases, losing more than half the gold. I therefore taught them the proper mode of working, and suggested some alteration in the construction of their cradles. I gave the name of Tarshish to the diggings: who first discovered them I cannot call to mind. Mines spreading at various intervals, over an extent of 1,000 miles, were almost simultaneously discovered; for, in addition to some hundreds whom I had instructed at Ophir (the fields first discovered), in the method of searching for gold, and in the character of country in which it should be searched for, great numbers of experienced miners returned from California on receiving news of the first discovery.

Having reported on these diggings, I was ordered to proceed to Araluen, near Braidwood, and report on a gold-field discovered there, in a country of granite formation. I, however, found the usual constants, schists, quartz, and trap in conjunction with the granite. Some 300 persons were at work.

The man who first found the diggings was pointed out to me. He told me that he had been induced to make a search for gold in that spot, because he saw swamp-oaks growing in the bed of the creek, similar to those he had seen at Ophir, where he had worked successfully for a short time. It is hardly necessary to say that particular kinds of timber afford no indication of an auriferous country, for almost all the various kinds that grow in the colony are common to the gold-fields.

I found, at this place, gold in fragments of granite, and in the granite boulders, which had the appearance of being cemented together by some mineral substance, formerly held in solution in the water which had transported them to their present resting-places. I had never before seen diggings of this kind—that is, with so much granite and so little slate and quartz. There were also remarkable quantities of ironstone, having the appearance of honey-comb, which, I presume, were portions of much larger masses, or probably veins. I believe this ironstone to be auriferous, though I was unable to detect any gold in it with a common magnifying-glass. The gold was obtained from a granite detritus, from one foot to ten or twelve below the surface. The upper soil was frequently of the richest description, altogether different to the sterile region of the Bathurst diggings.

The Araluen diggings are situated about eight miles from Braidwood. I estimated the produce of gold at from 10s. to 20s. per day; and, after a very extensive working, such has proved to be about the average.

I followed the Araluen Creek to the Moruya River, and the course of that river to the sea, a distance of fifty miles. There was gold very near the sea; but I was unable to report favourably of the Moruya, and although many trials have been made along its banks, it has not rewarded the diggers sufficiently to induce them to continue in that locality. In time to come it will, doubtless, be thought worthy of attention, as well as many hundreds of spots which I have prospected, but have not made generally known.

From Araluen I crossed the range into the Jingera and Tindary mountains, which in some places looked very promising; but the country was a complete bog. I therefore returned by way of Braidwood and Goulburn, and went to the Tumut River, near Gundagai. I did not find any gold there, although I have no doubt it exists in small quantities. The country, however, did not appear to me to invite a laborious search.

I had now examined such portions of the country as I had been desired to do, and once more bent my steps towards Sydney, from which I was distant about 300 miles. I reached my destination about the 15th of December, 1851.

I next received instructions to visit Moreton Bay, about 500 miles north of Sydney, with the view of ascertaining to what extent New England was auriferous, and to report on a reputed gold-field at the Hanging Rock; and upon another at Lord John's Swamp, on or near the Darling Downs. I started on this mission on the 7th of February, 1852.

Having explored this country, I next proceeded towards the Macdonald River, where I found gold in moderate quantities. The country was chiefly granite, and indeed almost everywhere throughout New England gold could be obtained in small quantities.

In June, 1852, I returned to Sydney. In the meantime the news received from the neighbouring colony of Victoria was most astounding. I had stated my belief that the whole cordillera of Australia would prove, in a greater or less degree, auriferous; but certainly never dreamed of the wonderful discoveries so shortly to be made there, which so completely threw the New South Wales diggings into the shade.

The auriferous wealth of New South Wales I believe to be boundless, and much more equally distributed than that in Victoria; but it requires a large population to develop it adequately: whereas, the gold-fields of Victoria are fewer and less continuous, but so enormously productive at particular spots that the hope of acquiring a rapid fortune will for a long time to come hold out attractions to the gold-seeker greater here than in the more extensive and widely-spread fields of the sister colony.

Being naturally desirous of seeing the gold-fields of Victoria, I obtained the governor's permission to visit them, and once more set out from Sydney in the early part of July, 1852.

I reached Goulburn about the middle of July. By the end of the month I reached Gundagai, which had recently been the scene of one of the most disastrous floods that ever visited New South Wales.

I then proceeded towards the River Murray, which forms the boundary between the colonies of New South Wales and Victoria. On the New South Wales side, a few miles from the river, the country promises fairly for a gold-field; and such, I doubt not, it will hereafter prove to be. Along the line of the river, on both sides, is one of the finest wheat-growing countries in the world, producing grain that weighed sixty-six pounds to the bushel.

After crossing the Murray I proceeded to the Queen's diggings, as they are called, a distance of about thirty-six miles. They were discovered in July, 1852, and are situated to the left of the main road to

Wangaratta, at the head of Read's Creek and its tributaries. Read's Creek is a tributary of the Queen's River. When I was there the principal diggings were on Spring Creek.

I found some hundreds were at work, with average success. The gold there is very fine, and found in a blue clay underlying beds of shingle, at an average depth of eight feet. I have taken a handful of this clay, weighing about one pound, which has produced about half an ounce of fine gold. Some parties were very fortunate; one in particular got a hundred weight of gold out of a claim or two not more than five feet deep.

The Spring Creek formation consists of granite, with a detritus of quartz, trap, slate, and granite, overlying it. At the head of the creek there is a formation of schists and quartz. I observed also basaltic whinstone. I have no doubt that the gold will be found to extend almost the whole way to Melbourne, along the spurs of the ranges at the head of the Goulbourn river.

After leaving Read's Creek, the country becomes low, scrubby, and uninviting, until you reach the flat land of the Ovens, which is a fine open box country, with the river banks of very rich soil. Wangaratta is the post-town, about twenty-five miles distant from the Spring Creek diggings and 200 miles from Melbourne.

At Kilmore, a town on the direct line from Sydney to Melbourne, and distant from the latter place about forty miles, I turned off to the left towards Bendigo. The Bendigo diggings were for a considerable period very extensively and profitably worked; the number of persons engaged there at one time being estimated at no fewer than 25,000. In one part of them a new feature presented itself. This was at a spot called the White Hills, situated on the north side of Bendigo Creek.

From Bendigo I proceeded to Mount Alexander, a distance of about thirty miles. These diggings are about nine miles in diameter. Forest Creek and Fryer's Creek present remarkably striking indications of a rich auriferous region. The others present no feature requiring particular notice.

From this quarter I proceeded to Ballarat, a distance of about sixty miles. The approach to it is a slight descent, presenting numerous trap-dykes and granular quartz in immense quantities; in many places for several feet deep there is nothing else but quartz.

Here are the Eureka diggings, which are from thirty to seventy-five feet deep; some of them have proved surpassingly rich. The sinking is through a loamy clay. The gold is deposited on the slate. A little nearer the camp at Ballarat, on the same range, the gold is on the surface, at an elevation of about one hundred feet; then comes the flat and the celebrated Golden Point. This spot has proved very rich, and is where the first washings in Victoria were commenced in good earnest.

The sinking is through a red clay, and the gold, as at Bendigo, is found on the ledge. These diggings possess a great natural advantage over any other in all Australia, in having, at an elevation of about sixty feet above the level of Golden Point, and distant about half-a-mile, a lagoon or swamp ten miles in diameter, where an abundant supply of water can always be had, and the required quantity can be regulated by means of flood-gates. I therefore consider this locality to be the most permanently settled as a mining district.

Having thus visited the principal gold fields throughout Australia—I mean such as at that time were being worked—I bent my course towards Melbourne, and thence returned by sea to Sydney. It now only remained for me to await the reward promised by the Colonial Government for my discovery, and resign office as Commissioner of Crown Lands; for it was determined that on receipt of the former I should vacate the latter.

The Legislative Council of New South Wales awarded me the sum of 10,000*l.*, deducting, by way of discount, the 500*l.* I first received; an amount of compensation which I by no means complain of. But I must say that I made a very bad bargain when I consented to leave the amount of reward to the discretion of that body; for I hardly think that, had I stipulated for the apparently small per centage of 10s. on every 100*l.* value of gold exported from Australia, for the period of three years from my first discovery, it would have been considered unreasonable. Indeed, I believe this remuneration would have been considered very moderate; yet that per centage on the exports for those three years, estimated to amount to 50,000,000*l.*, would have produced no less a sum than 250,000*l.*

Mr Hargraves has thus given to the world his own version of the first discovery of gold in placer deposits in Australia, together with his subsequent explorations on gold-fields already opened by the numerous gold-washers then in the colony. The theoretical portion of the book next follows, beginning with a transposition of the preamble of my first public letter to him, which first adverts to his confessed ignorance of geology as a science, and then continues to observe that the opinion of so many geologists on the theory of quartz abrasion about to be questioned, cannot—to quote exactly Mr Hargraves's borrowed sentiments—"be regarded as the result of investigation in each separate case, but almost blind adhesion to the authority of one or more who first broached the theory itself,"—meaning the theory of abrasion of quartz-veins as the origin of placer deposit gold—the one either first proposed or advisedly adopted by Sir R. Murchison. Mr Hargraves then continues, in the sentiments of my preamble, to add that, having no scientific reputation to stake on the truth or error of *his own theory*, it may perhaps be thought that he has not sufficient pretensions to put forward a theory at all, but that it is "scarcely possible for a man to be arduously engaged in any one pursuit for a long period of time without directing his thoughts beyond the mere mechanical part of his labours; and if his mind is not prejudiced in favour of any particular system, he naturally builds up theories of his own." Mr Hargraves then proceeds to expound that the force of gold and quartz in a fluid or liquid state would, in its passage upwards, "likewise at the same time suffice to throw the gold over those alluvial localities in which it is now so abundantly found; but being mixed with *matter far more perishable than quartz*, that matter acted upon by atmospheric influences, and by streams or floods, has long ago decomposed and formed the alluvial soil in which it now lies." This, says Mr Hargraves, "squares with the received theory of geologists themselves, who trace the formation of the earth's surface generally to volcanic action, so that it is only extending their comprehensive theory to a part which they would exclude from it." The exposition is, as nearly as could be effected by transposing my words, a summary of the theory which I had propounded to him, yet all expressed only in the first person singular, and strangely enough, while accepting the conclusion, there is not in the book a single line to state the fundamental facts upon which the conclusion is logically based. The adaptation in shape of placer deposit gold to the bed rock is not even once mentioned in Mr Hargraves's volume, although I had, when in California, frequently spoken upon this point, and since then had it set forth in the colony as forcibly as I could in all my public letters. The fact of placer deposit gold being moulded to the bed rock is indeed the best proof of its volcanic origin, and even if the fact were explicable in any other way, still it is the one leading fact which induced the writing of my letter brought by Mr Hargraves from California to Australia. The non-dissemination of gold through the mass in granites—another most important question in connection with the theory—is also left entirely unnoticed, but still the conclusion drawn from the data is accepted. It is, no doubt, much easier to accept ready-made conclusions than to investigate and appreciate the value of the facts which have led to them, especially where there is implicit confidence in the author consulted.

There is, under the article "Gold" in Dr Ure's 'Dictionary of Arts, Manufactures, and Mines,' a remarkable passage, in which, after stating that the gold found in the beds of rivers is supposed by some to have been torn out by the waters from the veins and primitive rocks which they traverse, the writer uses these suggestive words: "The gold in them belongs, however, to the grounds washed by the waters as they glide along." On first reading this passage, I had dwelt upon it as being confirmatory of my theory in contra-distinction to the abrasion doctrine, yet after all it must be confessed that the words are exceedingly equivocal. What is meant by the "grounds?" and how did the gold first arrive in the "grounds," if not torn from the rocks? The information reminds one of the boy who informed his more dull companion that it was the piston-rod going up and down that caused the steam engine to go, but what first moved the piston-rod neither of them had investigated. If the rivers have removed gold from "the grounds" of river beds and not from the rocks, it is very satisfactory to me to find it so stated as a fact, for my own conclusions were much to the same effect; but the opinion only stimulates the further inquiry, How did gold come into the "grounds"? Mr Hargraves has quoted the passage, and says, "These arguments, or rather these facts, appear unanswerable, and so simple that any one who has never read a syllable on the subject of geology may comprehend them and see their force." I think, as far as the statements are negative of the doctrine of abrasion of quartz-veins and granites, their force is clear enough, but then no better theory of the formation of gold in the "grounds" is offered by that writer, so that the passage remains after all very ambiguous; the quotation is nevertheless of great interest. The following are the exact words :—

> "It has been supposed that the gold found in the beds of rivers had been torn out by the waters from the veins and primitive rocks which they traverse. Some have even searched, but in vain, at the source of auriferous streams for the native bed of this precious metal. The gold in them belongs, however, to the grounds washed by the waters as they glide along. This opinion, suggested at first by Delius, and supported by Deboin, Geuttard, Robitant, Balbo, and others, is founded on just observation. 1st, The soil of these plains contains frequently, at a certain depth, and in several spots, spangles of gold separable by washing. 2nd, The beds of auriferous rivers and streamlets contain more gold, after storms of rain, upon the plains, than in any other circumstances. 3rd, It happens, almost always, that gold is found among the sands of rivers only in a very circumscribed space; on ascending these rivers their sands cease to afford gold; though, did this metal come from the rocks alone, it should be found more abundantly near the source of the rivers. Thus it is known that the Orco contains no gold, except from Pont to its junction with the Po. The Techeeno affords gold only below the Lago Maggiore, and, consequently, far from the primitive mountains, after crossing a lake, where its course is slackened, and into which whatsoever is carried down from the mountains must have been deposited. The Rhine gives more gold near Strasburg than near Bâsle, though the latter be much closer to the mountains. The sands of the Danube do not contain a grain of gold, while this river runs into a mountainous region; that is, from the frontiers of the Bishopric of Passau to Efferding; but its sands become more auriferous in the plains below. The same thing is true of the Ems; the sands of the upper portion of this river, as it flows among the mountains of Styria, include no gold; but from its entrance into the plain of Steyer, till its embouchure in the Danube, its sands become auriferous, and are even rich enough to be washed with profit."

By some mistake in attempting to explain the theory I had entrusted to him, Mr Hargraves had denied that "quartz is the matrix of gold," instead of only denying "the derivation of all alluvial gold from destroyed quartz-veins." The Rev. Mr Clarke, shortly after receiving a copy of the book, and when replying to the inquiry of a local journalist as to the probability of gold being found in abundance on the Hunter River, alludes as follows to Mr Hargraves's theoretical effusions. The essay, addressed to the Editor of the 'Herald,' relates to Gold on Eastern and Western Slopes of the Australian Cordillera.

Sir,—In your issue of the 31st ult. I find a leading article on the discovery of a gold-field on the upper waters of the Hunter, in which occur the following remarks:

"Why should not the head waters of the Manning, the Hastings, the M'Leay, the Clarence, the Richmond yield gold as well as the Hunter?

"We cannot pretend to geological knowledge, but all that we have read of geological notices goes to prove the very great similarity in general character of the Dividing Range throughout its length, and of the spurs branching from it.

"Probably W. B. C., for whom, before the locality was made known, a writer in the 'Herald' claimed the present discovery, will kindly enlighten us on this point."

Thus called on, I will not refuse to offer an opinion on the subject, though I do not know the author of the statement to which you refer; nor have I before this contributed anything to the newspapers on the Hunter Gold-field.

In my reports to the Government I have, however, made incidental mention of the geology of the Hunter, in a brief abstract of facts drawn up to connect my researches in the Southern and Northern counties, and direct statements as to the fact of having found gold in the basin of that river, and in the head drainages of some of the other rivers mentioned by you.

The general views which I have entertained on the persistency of character in the geological formations of the colony, and especially on the flanks of the Cordillera, or as it is generally but vaguely called, "The Dividing Range," are pretty well known. I have devoted much of the space in some of my reports to this very question; and I have had the satisfaction of seeing those views adopted and distinctly claimed by others as their own, after I had demonstrated the truth of them by actual examination. Nay, so singular in this respect has been the deference entertained for these opinions, enunciated in explanation of some of the geological phenomena of this colony, that, after a very liberal display of what the Editor of a Nottinghamshire journal calls *ridicule*, after many "broad grins" at my expense, on the part of Baron Hargraves, because I have ventured to suppose high-pressure steam, acting on silicia combined with an alkali, has been employed in the formation of quartz-veins, that most consistent and very original *savant* has actually thus spoken of the identical supposition in his book. "But to come to *my own* theory; I believe gold and quartz to be of *twin birth*, and that they were *ejected simultaneously from the bowels of the earth*, the gold in a fluid state, and the quartz in the form of a liquid *resembling a jet of steam*; and that when this *steam*, or *liquid*, in its passage upward, reached a temperature sufficiently cold to condense it, the *liquid substance* became solid, and retained the particles of gold that, at the instant, were in contact with it." That is, the quartz was impregnated with gold, and so was a true "*matrix;*" and yet above, he says, "the theory, then, to which I *object* is this, *that quartz* *is the matrix of gold,*" which would certainly be droll enough, on the supposition that his "*own theory*" is, "I believe, gold and quartz to be of *twin birth*." I say, therefore, this "consistent and original *savant*" has, in this instance, adopted my "twins" as his own, and by virtue of his own processes has converted one into the parent of the other, which is a more singular connection than existed between the Siamese twins, who, although a plural unit, never called each other "Mamma."

In order to prevent the possibility of my following so bad an example by taking and appropriating what does not belong to me (having no fear of "the bloody hand of Ulster," or the balls and strawberry leaves of a coronet before my eyes as a legitimate reward), I will on this occasion make mention only of that to which I have the greatest right, my own conclusions from my own observation, and my own statements as already before the public, or such as, on my own responsibility, I now put forth in answer to your call.

If there be a general character of the Dividing Range throughout its length, and of the spurs branching from it, as you believe, and as, with exceptions relative to local influences, I have already demonstrated in my reports, your question admits of an easy and brief solution. There is no reason whatever why "the head waters of the Manning, the Hastings, the M'Leay, the Clarence, the Richmond" should not "yield gold as well as the Hunter," if (which will explain what I mean by local influences) the rocks generally auriferous are there found.

The question you have put turns upon this—is there or is there not an anomaly in gold on eastern waters in New South Wales? Now, experience has proved, in the case of the Braidwood district, that there is abundance of gold in the basin of the Shoalhaven, which is a coast river. My own explorations of that river and its tributaries have proved to me, that its basin is auriferous from near its head to nearly its junction with the salt water. But when we look at the features of the auriferous country we find these remarkable facts. The main course of the river is parallel nearly all the way, with the coast range (truly *a* "Dividing Range," but not that usually considered "*the* Dividing Range" of the colony, or the "Cordillera"), on which rise the prominent summits of the Budawang, Curruebillee, and other mountains; we find also that Yalwal Creek, which joins the Shoalhaven not far above the junction of the sea waters, follows the parallel of the Shoalhaven on the meridian of Budawang. The direction of these parallels is *northerly*. We find also, that the tributaries to the Shoalhaven, flowing from the Budawang range, have a *northwesterly* trend. We find also high plateaux in certain parts of this district, as above Braidwood and Narriga, of very distinct character, and exhibiting on their flanks evidences of vast dislocation and erosion. We find, moreover, the formations along this basin and in these plateaux exhibiting a general character in their dispositions and arrangements, the rocks being chiefly those which are of a certain comparative epoch. It was these considerations which chiefly induced me to make the examination of the Shoalhaven the first of my labours during my explorations of the year 1851. Nor was I deceived. I was enabled to report, what I found, that *hornblendic* rocks marked the chief localities of gold, and that not only the whole of the ranges and creeks about the Braidwood district (which has since been found perfectly true) held gold, but also that it exists in "all the creeks falling to the Shoalhaven from the Narriga district." The latter statement has been found equally true, for Yalwal has several times been tried with success, and, I am told, is at this moment being worked; and at distances of twenty-two and thirty miles N. of Braidwood there are parties also working in other localities, and although arguments have been employed to refute, if possible, my statement that hornblendic granite is sometimes auriferous, without advancing any proofs from the facts developed on the Ovens, Mitta Mitta, or Uringalla, or elsewhere, it is known that Carter's party, who held claims on Major's Creek, not only got as much as seventeen ounces *per diem*, but even washed some of the gold from granite, which they broke up for more than a foot in thickness! Francis' party did the same; and Mr Hargraves broke up with my hammer, at Jineroo, in my presence, a lump of granite which I gave him, and the particles of gold fell out under the blow, to his conviction of the truth of my statement; and he recorded that circumstance in his report, as one of his discoveries. Slates with quartz-veins rest upon that granite, and have been affected by greenstone, which is also a hornblendic rock.

Now, this Shoalhaven district has direct analogies with that at the head of the Hunter. In fact, though the Shoalhaven is an *eastern water*, it actually runs along the Cordillera on the *western* side of the Budawang range, and the tributaries that supply it are also westerly waters. It is on these waters that the principal gold has been found. It may be said the Aralnen, which has fully realised all I expected of it, is an easterly water; but I doubt if very much gold will be found below its junction with the Dewa River, which is on the meridian of the Budawang Range; and it remains to be discovered whether much gold (some I know of) exists along the course of the Clyde. But as far as the Shoalhaven is concerned, the gold exists in the greatest abundance *where hornblende rocks* or *serpentine* and *quartziferous schists occur*, and *where the drainages flow in a north* or *north-westerly direction*. The Clyde flows to the south, and the chief gold there will probably be found about the Buckenbowra Range, for the slates at the head of the Clyde are crested by horizontal flaggy sand-stones and conglomerates.

Now take the head of the Hunter. A statement has been made as to this gold-field occurring on the *east side of the Dividing Range*. But, in fact, it occurs on the *west* side of what is called a spur from the Liverpool Range, whence the chief of the creeks that are auriferous flow northerly or westerly to the Hunter, which is a southerly stream so far as Musswellbrook and Merton, the remainder of the river belonging to the Goulburn, and flowing eastwardly.

As hornblendic rocks, slates with quartz, and some granite not hornblendic, occupy a great part of the district, though capped by numbers of the carboniferous formation, just as the range east of the Budawang is (Pigeon house, Wombellawa, &c.), gold might be anticipated there, and as the drainage is north and west from the range which chiefly supplies it, it has been dispersed, just as the gold along the Shoalhaven has been dispersed. It was from the effects of this dispersion that, as I reported to the Government, I was enabled to detect it in the detritus on the slopes of Warland's Range, near Murrurrundi, and below Murulla.

Regarding the physical features of the country at the head of the Hunter, one might expect gold there as well as at Hanging Rock, for examination discloses the existence of the same older classes of rocks at the base of the Liverpool Range on both sides, the spur I have been speaking of being in fact a *continuation* of the *true* meridian or Dividing Range from New England, whereas the Liverpool Range is itself a long spur from the New England plateau, formed by the outburst of igneous matter along a fissure which runs parallel with the fault marked by the course of the Goulburn and Lower Hunter, and which was probably produced by the outburst. Gold, therefore, occurring at the head of the Hunter is in analogy with the facts exhibited by the drainages from the western slopes of the Budawang, the Alps, and the western side of the new England plateau. It is, strictly speaking, a western and not an eastern gold-field to which our attention is invited, the undisturbed gold being limited to the area occupied by the hornblendic and quartziferous rocks, and the dispersion of it in alluvia being confined to the district in which the drainages are as indicated. It may be satisfactory to some to know that, whether there be much or little in the gold-field of the Upper Hunter, it is valuable, being more than twenty-two carats fine, and worth very nearly 4*l.* sterling per ounce. With respect to your other localities, as Araluen, Buckenbowra, &c., show us, that even on some easterly waters there may be some gold, so under analogous circumstances there may be gold on the Manning, Hastings, &c., for a short distance below their rise, and limited by the ordinary processes of drainage as to its dispersion.

I know that it so exists on the Barnard, the Macleay, and the Clarence from personal examination, though, as I infer from the course assumed for the first dispersing current, viz., one from the southward and eastward, and from the general features of the eastern side of the Cordillera, which is generally a lofty escarpment, the auriferous deposits cannot have been formed in the same way, if such exist, in the same proportion on the sea-board as on the summit and western slopes of the Cordillera.

But that gold may exist in the rocks even of the middle of the Manning and Macleay Districts is almost undoubted, for the rocks that are in some localities auriferous exist even close to the sea about Port Macquarie, and in the broken region of the lower Macleay. Indeed, I have been often surprised that no regular search has been made in these districts to test the probability of its occurrence. Those who rely on the presence of hornblendic rocks as an indication, will not wonder that the heads of the creeks running into the upper Hunter should be auriferous, when it is considered that at the sources of the Paterson, Allyn, Williams, Chichester, &c., there exists an enormous plateau of trap (of which a great portion is magnetic), a phenomenon repeated on the edge of the New England plateau below the junction of the Apsley and Macleay. Nor shall I be surprised if a few specks of gold be detected in any of the creeks falling from the Liverpool Range, and more at the head of the Rouchel; for it exists at the head of the Isis. What may be the ultimate fate of the Hunter Gold Field remains to be seen, but it is not exactly a new discovery. I would call to mind that Stewart's Brook, which is between the Rouchel and Bell's Creek (Moonan Creek of the newspapers), has been long prospected, and some gold was got from it in 1851. Looking at the facts that gold has been detected at various points, from the head of the range to Sir Edward Patty's Pass, above the source of the Hunter, and from the head of the Isis to Goodan Goodan, there must be a good deal scattered thinly over that area, though likely to be found most abundantly where the deep creeks that score the face of the escarpments come down into the lower country.

We have yet much to learn (though our lessons have extended over four years) of the history of gold in Australia, but this we may know from our present experience—that the existence of gold in the containing rocks is a different subject from the dispersion of gold and its deposit in alluvia, that gold may exist *in situ* in numerous places little expected, and that alluvial deposits may, nevertheless, in other localities, be the sole evidence of its former existence in the rocks of the vicinity. In the year 1851, I published the results of experiments on quartz rock, exhibiting the existence of gold in such rock, though actually invisible, and since that time similar facts have been demonstrated by others. So that quartz-crushing has now come into operation, and shown us that where alluvial gold is not abundant, profitable works may still be carried on. And an American digger of great intelligence wrote to me a day or two ago, telling me, for instance, he is satisfied the Upper Adelong will supply abundance of rock profitable for crushing, though the alluvia there are not as rich as on Tumbarumba Creek.

Now, with these facts in view (since I have in my reports mentioned my discovery of the outcrops of the older formations in localities of the middle Hunter), it might be that some traces of the existence of gold may be detected, in some of the valleys that debouch into the Hunter, even from the north side. And again, my own observations, confirmed by correspondents at the Victoria diggings, and by Mr Selwyn, the accomplished geological surveyor of Victoria, show me that much of the younger trap has overflowed the gold alluvia, and therefore, where there are symptoms of gold near by, it may be advisable to strip the black soil and work under the trap in search of gold. I do not, therefore, despair of the success that may attend operations in what have hitherto been considered unlikely places. Nevertheless I would keep in mind the guiding facts, as I interpret them, that particular rocks, and a particular direction of drainage, are the best indices to the expectation of a good gold-field; and that in the beds of the coal formation, so abundant on the Hunter, it is useless to look for it.

You mention the Macleay, the Clarence, and the Richmond, asking why there ought not to be gold in them as well as in the Hunter?

In my reports you will find proofs enough to show its existence in the head waters, and for a considerable part of the courses of the former two of those rivers. There is not a single Clarence water flowing *to* the *north* that does not contain gold; it has been found as far down as Dobie's and Ogilvie's runs. The abundance of water in the Glen Elgin branch (the head of the Northern Rocky River) is the main reason why that arm has not been thoroughly worked. On the Richmond a little gold, near the main range, has been found, but the course of its waters is the wrong way. If much exists, there it is still in the rocks. The Macleay, at its chief sources, shows that the rocks through which it makes its way are auriferous.

The Macleay is auriferous where local causes of dispersion have operated on the rocks, and those sources which rise near Salisbury, Armidale, and at once from Ben Lomond, the culminating point and principal source of eruption of trap in that country, have more or less gold. Cameron's Creek is well known as an auriferous water. From my examination of New England, I am satisfied that a vast deal more gold exists there, even in alluvial soil, than is generally known; but as there are not many quartz reefs (as they are now called), and there is an unseemly prejudice against granite as a gold producer, though there are many gold-fields in *granite*, as about Braidwood and the Ovens, and one on the Uringalla, or S. W. Rocky River, and another on Glen Elgin or Bergouillee, the N. E. Rocky River, people will not persevere in giving the country a fair trial. The Upper Macleay waters are, in direction, the counterparts of the Araluen waters; and these, with two or three other cases, are the exceptions that prove the rule I have laid down, as to the apparent direction of the dispersing current. The Ellenborough River, a tributary of the Hastings, which is slightly auriferous, is another proof of the general correctness of the view. The auriferous patches (though limited) between Maryland and Warwick, are a second. The whole of the creeks and rivers flowing to the Murrumbidgee from the Western side of the Alps, the Tumut, with Gooberagandra Creek, Tumbarumba, Adelong, Yeven Yeven, Tarcutta, Caraboot, &c., and many smaller, in all of which there is much gold, prove the same general fact. These were the streams I pointed out to the Colonial Secretary in June, 1851, and the mention of which by me he embodied in the Instructions to "Mr Commissioner Hargraves."

The waters of the Western Diggings, such as the Turon, Meroo, and other feeders of the Macquarie, supply abundance of examples. Similar facts may be quoted also from Victoria. In fact, with some rare exceptions, alluvial gold is found in New South Wales, perhaps all through Eastern Australia, as far as the 25th degree of latitude, more abundantly, or only, on waters flowing northerly or north-westerly,—a universal, or only rarely excepted fact like this cannot be accidental. It ought to be a guide to a close examination of the country at the head of the Coodradigbee, where, I am convinced, there must be a deposit, as there is a large table land or plateau whence rise, in addition, the Tumut, Eucumbene, &c., on all of which I found gold. It ought to be a guide to the exploration of the country between Albury and the Murrumbidgee, and to that on the Upper Bogan, and about Yeo Yeo and the county of Monteagle.

In all the rivers running into the Upper Murrumbidgee from its great bend to its western turn, all which run *northward*, I found gold; Kythera, Kybean, Eumbaralla, Queanbeyan, Molonglo, Yass rivers are witnesses. The whole of the auriferous Abercrombie waters and those at the head of the Lachlan justify the same conclusion. And I believe a careful review of all the facts that have transpired respecting what are called dry diggings will lead to the inference that these deposits were first accumulated by waters flowing *northerly* and *westerly*, however they may have since furnished small drifts in opposite directions in the line of modern drainages, or may have been increased by disintregration and local sedimentary action. It is thus that much of the gold in Araluen Valley has come down from the dry deposits 2,000 feet above. Nine times out of ten, I think, the water-courses of the present surface will betray alluvial gold, where they run towards N. and W. across rocks that are auriferous *in situ;* of course this proposition can be refuted if untrue, but I believe it to be a fair general deduction, from all I have seen and heard.

With this rule in mind, it will be seen that, supposing the carboniferous rocks of the Hunter and Goulburn did not prevent the expectation of gold, some might be found in the tributaries of the south bank, and perhaps some of them do hold gold at their heads, but I do not think any great amount of gold will be found in the northern tributaries; and the opinion is confirmed by the facts I stated at the commencement of this letter respecting the actual direction of the creeks of the Upper Hunter. It will be seen, then, what likelihood there is of gold at the heads of the Manning, Hastings, and Richmond.

The Albert, the Logan, and other waters of the so-called Moreton Bay district may have gold, but that region is covered up by the carboniferous formation and by trap detritus, of an age probably younger than the true gold-bearing greenstones, and the gold is obscured.

Neurum Neurum Creek, which has some gold, flows also to the north; the gold has, therefore, been dispersed in that direction. The reason why not more gold has been discovered further north than the slight deposits on the Mary, Burnett, &c., may be, principally, that the gold-bearing rocks are concealed by younger formations, and the drainage begins to take another trend. I have in my possession one sample from a northern drainage at the head of the Mary; and one from a creek in the Port Curtis district. These are too unimportant to reason from; but if the conclusion deduced from the multitude of more prominent facts in the southern and western gold districts be considered just, it would not be difficult to give it a useful application.

In entering upon this discussion, I have only been actuated by a desire to add my little contribution to the general fund of knowledge; and to comply with the call made upon me. I am aware my view of the dispersion of gold is not that adopted by an intelligent writer in the 'Empire,' between whom and myself there is no difference except on this point; but I give my *opinions* as they are suggested to my own mind, without any intention of discussing them in reply, should they be objected to, for my time is too much occupied to allow me to enter into controversy, though I have had another intention, that of laying the whole of my researches in the field and in the closet before the public, should leisure, of which I have had none for sixteen years, and other necessary means, ever be mine to employ. Any writer, however, whose information will enable him to correct errors in my statements of what I consider *facts*, or will supply me with additional facts, will lay me under an obligation, which I will thankfully acknowledge.

St Leonard's, November 7, 1855. W. B. C.

Just after the appearance of the foregoing public letter, Mr Hargraves and Mr Thomson arrived in the colony from Europe, shortly after which the following observations of mine were published in the colony on William Howitt's critique and on Mr Hargraves's book generally, in an ELEVENTH public letter, addressed to the Editor of the 'Empire,' and entitled "WILLIAM HOWITT ON GOLD."

SIR,—A "Retired Gold Digger," or scientific writer using that disguise, published in your columns some months ago an admirable geological description of the White Hills at Bendigo, and invited at the time from observers who had maturely considered the subject any statement of other views or expression of opinion upon his own truth-seeking speculations. The practical scientific correspondent will no doubt feel gratified to find that Mr William Howitt, in his late popular work entitled "Land, Labour, and Gold; or Two Years in Victoria," dwells at some length on the question. It is perhaps not forgotten that the anonymous geological writer conceives that the greater part of the clean granular metal in the gold-beds at Bendigo has been released by a specified natural operation from the neighbouring auriferous quartz-veins. The Retired Digger or modest professor (whose extreme diffidence is a fault of which some less bashful fellow-labourer may take an unfair advantage) believes, in common with other inquirers, that these veins, dykes, or reefs have had an igneous origin, and with some apparent probability he infers that the perfect detachment of the brilliant metal from its ambient matrix has been there effected by a heavy body of water, the result of excessive rain. A cold flood travelling along a definite channel, by coming suddenly in contact with the heated earth, cut through and otherwise shattered into fragments, according to his reasoning, the lately liquefied auriferous quartz-veins, whilst they yet retained intense heat and existed in a semi-solid state, and consequently (as proved by certain experiments which the writer described) the matrix gold would be completely released by a sort of explosion, and the grains of metal during translation by the watery flood would be shaken to the bottom entirely free from quartz. The unknown geologist, then, concludes (upon the assumption that the clean gold grains were extricated in this manner from their stony envelope) that the facile rounding of the severed *non-auriferous* quartz fragments in such close proximity to the massive *auriferous* quartz veins from which they have apparently been derived either before, after, or during the process of petrifaction, is to be attributed to an attrition in water of the pieces of quartz as they were borne along in an imperfectly hardened condition—that condition being a consequence of their parent veinstones having but partially cooled down at the time the pebbles or nodules were torn from them; thus in a particular instance an intermediate possibility is ingeniously suggested by way of compromise between the requirements of the aqueous abrasion doctrine of Sir R. I. Murchison, and the supposed petrifaction of quartz nodules, when rolling in a liquid or pasty state, as inferred and related in my theory. The subject is impartially treated by Mr Howitt, who supports the opinion of the self-styled Retired Gold Digger, as far as regards a disturbance and friction of the non-auriferous quartz pebbles by water, before their final deposition immediately over the copiously-strewn, ovoid-shaped, so-called alluvial gold, which by some natural operation has been spread in free grains upon a soft white floor of vertical cleavage, beneath the three great tumuli of conglomerated spheroidal quartz stones, known as the first, second, and third White Hills, on Bendigo Creek; yet Mr Howitt entirely agrees with me (and as I have not the pleasure of a personal acquaintance, it is obviously a free and an impartial opinion, undisfigured by those superfluous compliments which associated and exclusive men of science at times bestow upon each other) in totally disbelieving the pseudo-scientific ideas that either the disintegration of imaginary schists, and like rocks alleged to contain gold equably diffused in grains through the mass, or the mechanical destruction of perfectly petrified auriferous quartz veins originated the clean and apparently once melted gold in the richer auriferous beds. Mr Howitt is another of the number whose opinions coincide with those of the Rev. W. B. Clarke, in referring the formation of gold in quartz veins to thermal and igneous influences, in contradistinction to those who suppose its extremely slow segregation and molecular accretion by electro-magnetic forces. Mr Howitt likewise looks upon quartz and gold as being twin-born minerals; it is also gratifying to find that Mr Hargraves, after taking scientific advice in Europe, has promulgated the same views, which are again curiously set forth in the recent publication of which the "discoverer of Australian gold" (to use an expression in its preface) is the ostensible author. It is candidly admitted in the pages of "Australia and its Gold Fields," that the opinions which a foolish Nottingham tyro once termed "the romantic notions of the Rev. W. B. Clarke about the formation of gold in quartz veins" have at length been accepted by Mr Hargraves. Those opinions, together with my formerly printed ideas respecting the origin of the precious metal in surface beds (imperfectly explained in my lava theory at the end of the volume) now conjointly constitute, it is satisfactory to reflect, Mr Hargraves's "own theory"—the words "by adoption" having by some inadvertency been omitted in both cases,—the fault may be chargeable either to the author's literary manager, a negligent amanuensis, or careless publishers. Mr Hargraves cannot be supposed to have encouraged these irregularities, but omissions of the kind which do injustice to others are so numerous in the third and fourth chapters of that singular literary production, that extraordinary blunders must have been committed in some of the book-making departments.

The experience of another of your correspondents, at the time referred to, quite agreed with my own concerning the unsoundness of the doctrine of an equable diffusion of visible gold through the mass of any schistose rocks (otherwise than in the quartzy vein-stones which traverse them), since that writer, though "long engaged in California and Australia in every phase of gold-mining, had in no single instance ever found the metal at any depth in any of the metamorphic rocks, except drift gold upon the surface in their cleavage and fractures;" yet, as far as related to the moulding of fused gold upon the face of the bedding rock, the same informant remarked that "alluvial gold appeared to the most careless of observers to be altogether of mechanical deposition." Mr Howitt, it is seen, on the contrary, observes that the fact of gold having been melted on the floor like paste dabbed upon a table, or liquid lead run into moulds, is not only a plain truth, but the plainest of truths at the diggings. The "Retired Digger" also admitted that "Nature speaks very plainly on this subject at the various gold-diggings;" and another witness, calling himself "a Working Miner" (yet delivering an opinion very much like a scientific proficient), confirmed the allegation by his testimony that "Nature does indeed speak unequivocally as far as regards the general fact of alluvial gold being conformable in shape to the rock upon which it rests." Thus the several critics establish all the great fundamental facts, both positive and negative, hitherto unpossessed by the scientific world, which afford the data for the perishable lava theory.

However lightly some may estimate the value of such apparently idle speculations, it ought never to be forgotten that theory, founded upon the just appreciation of facts in nature, stands in the same relation to practice that thought does to action. Any guiding principle derived from observation—perhaps even the erroneous and incomplete hypothesis of Sir R. I. Murchison, framed upon the aqueous abrasion and equable diffusion doctrines that retarded discovery so much—is better than complete confusion; but to connect a multitude of isolated facts into a system more coherent as a whole is to advance towards finding general laws from which consequences may with certainty be deduced.

The distribution of gold over the earth's surface by floods of water, whether such floods have accompanied or immediately followed any terrestrial convulsion that upheaved gold from subterranean depths, or whether ordinary drainage has since effected any considerable dispersion and re-arrangement of the metallic granules in new deposits, is indeed a somewhat different question (as implied not long ago in the 'Herald' in a dissertation upon gold on the Hunter River) from that of their original formation, either on the surface of granites or of slates, or in any of the richer horizontal beds where the *primâ facie* indications of an igneous origin are more palpable. Wherever auriferous sites have been determined in Australia, either by the scientific geological and geographical comparisons of the Rev. W. B. Clarke, or by tin-dish examinations of particular districts, it is only gold-miners in numbers that can fully prove their ultimate value; but upon the principles which Mr Howitt corroborates respecting an overflow of molten gold there is always a probability that the drift-covered magazines of the precious metal concealed in those neighbourhoods will be found, when the bedding rock is thoroughly exposed, to be more prolific than any collections of gold grains that may by any means have been first widely scattered on the surface, or released from an imaginary equable diffusion through the entire mass of granites and greenstones, and then gathered together in beds by the ordinary action of water. Gold deposits of superior richness (where other geological requisites prevail) may ever be reasonably expected in the vicinity of those igneous outbursts of trappean and granitoid rocks, which all observers now agree in believing to be in some way connected with the local origin of the metal, as well as in those cases where auriferous quartz-veins more prominently characterise the discovered auriferous locality, or in those other instances where the flattened character of the buried metal decidedly marks its original moulding upon the laminated slate formations beneath it. Increasing experience brings accumulating proofs that it is from original surface beds, and not from disintegrated matrices of stone, that the richer stream deposits and the more widely dispersed grains have both been removed. The progress of development in New South Wales (lately on the Wentworth gold field, and again at Ophir, by Mr White) continues to attest the reality of these lucrative surface beds of clean gold frequently unabraded and untransported, which rest as nearly as may be upon the site of original position. The latest tidings from California repeats the experience of the past, and the veteran gold-diggers in that highly productive State, by driving innumerable tunnels through the hills, and under the mountain heaps of rounded non-auriferous quartz pebbles and shattered slates, are yet, with legitimate industry, ceaselessly unlocking the vast bullion vaults of Nature entombed beneath them. It is still in this manner that the experienced gold-hunters on the other side of the Pacific unearth the object of pursuit hidden at the bottom of such accumulations; and although the covered metal is there in some instances overlaid with peculiar lavas, volcanic tufa, and other materials, yet never in any quantity are the heaped-up quartz pebbles themselves gold-containing fragments; and at the Victorian diggings impartial observers now admit that the prolific horizontally-expanded, drift-and-quartz-pebble-covered beds, gutter-bottoms and leads which constitute the extensive treasure-trove of clean and clay-enveloped metallic grains in that favoured land, where the variously named gold-containing horizontal depressions encircle the numerous gold-studded quartz-veins (or reefs, as they are locally termed) which penetrate with their metallic contents the earth's crust almost perpendicularly, present altogether a crowd of phenomena that convinces common-sense beholders equally with philosophic investigators and scientific reasoners, that the bulk of the precious metal in alluvia has not there been driven to any considerable distance from the vents whence it has issued.

The erudite person who wrote the little—the emphatically little—book to which Mr Hargraves unfortunately consented to affix his name, displays therein, with success, his own high classical attainments. Herodotus, Homer, and Pliny are quoted and translated in quite a masterly manner. Mr Hargraves, however, rarely if ever, in past times, troubled himself about these ancient authorities; perhaps never before even heard of their names. But when the learned gentleman attempts to argue that Sir R. I. Murchison was the *first* scientific discoverer of gold, the sophistry of the literary adept only proves how little he really understands of the true bearing of his subject. If the published testimony of his Honour Mr Justice Therry, Mr James Macarthur, M.L.C., Captain King, R.N., and half a score other gentlemen of equally good repute can be believed, then that renowned exhumer of graptolites is but second in the order of time to the Rev. W. B. Clarke as an *à-priori* discoverer of the abundance of gold in the Australian Cordillera. As an actual finder of tangible gold in New South Wales, the Rev. W. B. Clarke undeniably takes ten years' precedence even of Mr Hargraves (as the latter frankly admits), and incomparable as is the author of 'The Silurian System' in special departments of geology, I contend for my own early views of the origin of alluvial gold as being more correct in principle, and as having, by opening the gold-fields in Australia, been more immediately followed by practical results than the hasty surmises, inveterate prejudices, and extravagant fallacies, published by the palæontological baronet, even after his return from the Russian gold-diggings.

The *undiscovery* of the Murchison chimeras—the discovery that alluvial gold had in many instances neither been drifted far from its original position, nor to any great extent mechanically released from a petrified quartz matrix,—nor disintegrated from a supposed state of equable diffusion in schists and granites,—that the loose grains and lumps of surface metal had not in frequent cases been abraded since they were severally fused, condensed, or otherwise concreted, but that they had often been apparently originally moulded upon the slates and granites beneath them,—these were my Californian triumphs. The mineral aspect of the gold-producing districts in the interior of New South Wales, and the previous gold-findings in quartz near Wellington, were already familiar to me; and it is a proud satisfaction to know, that my early opinions led through a chain of circumstances to the famous discovery at Ophir of the first workable gold-field in Australia. Mr John Hardman Lister and his associates proved beyond doubt the extreme productiveness of this memorable spot in April, 1851. Mr Lister plainly told the select committee that he had sought for gold in the quartz-veins at Ophir during the previous two years, and had been induced to do so by reading the newspapers (the contributions being most likely those of the Rev. W. B. Clarke). Mr Lister then confessed that he had failed to find any gold in them, but after having been taught how to examine the inequalities of the slates, he finally succeeded in discovering in the same locality those exceedingly valuable gold deposits of world-wide notoriety in elongated beds (the present watercourses), the clean gold in which never has been derived, in my opinion, from a petrified quartz-matrix at all. The unparalleled success of Mr Lister was speedily followed by the finding of alluvial gold in all the other districts which I had pointed out to Mr Hargraves, both in the southern and northern parts of the colony, and it is but lately I have learnt that, in 1851, the Rev. W. B. Clarke himself discovered alluvial gold upon my former sheep-run of Goodgood *only after Mr Hargraves had shown my former letter to him*—(this fact, and indeed the very existence of that letter, are both strangely ignored in Mr Hargraves's book)!—and yet the Rev. W. B. Clarke—the first scientific discoverer of gold in Australia—the co-student in geology with Sir R. I. Murchison, and his anticipator in foretelling the abundance of gold in the Australian Cordillera—the probable newspaper writer that encouraged the search for gold at Ophir, and the actual demonstrator of the existence of alluvial gold at Goodgood, could not himself detect any gold in the quartz-veins at either place, for the very plain reason that there is no gold in them.

There is still further evidence that all alluvial gold has not been disintegrated from petrified quartz-veins. Mr Hargraves, on his return from California to join his family in New South Wales, landed in the colony in January, 1851. Mr James Norton, an eminent attorney in Sydney, then informed him that another discovery of gold, in its quartz-matrix, had been made by Mr Icely, of Coombing, a considerable landed proprietor in the western districts. Mr Hargraves, in consequence of this additional information, obtained an introductory letter to that gentleman, and proceeded to the western districts with the intention of prospecting for alluvial gold in the first instance, in the neighbourhood of the auriferous quartz discovered by Mr Icely. (As acknowledged by Mr Hargraves, in his examination before the select committee.) Mr Hargraves, on his way to Coombing, met Mr Icely coming to Sydney, therefore he (Mr Hargraves) turned aside to make his first trials at alluvial gold-finding, in the watercourses around the matrix-gold already mentioned near Wellington. (As distinctly related in the minutes of Mr Lister's evidence.) Mr Hargraves stopped on the way thither at Mrs Lister's inn, at Guyong, distant at least fifty miles from the auriferous quartz-vein near Wellington. Mr Lister there and at that time told him that it was all a mistake about gold being in the quartz-veins at Summer Hill Creek (in the immediate neighbourhood of the inn at Guyong), as he (Mr Lister) had been led to believe by reading the newspapers, and as some geologists, with whom he had been out to make an examination, had supposed. It seems that upon this creek, which had already an auriferous reputation, the first experiments in gold-washing were made on the 12th February, 1851. Mr

Hargraves then gladly recollected my often-expressed opinions, that in those sections of the country where I had already witnessed the favourable geological conditions, it was highly probable that alluvial gold might have been naturally produced in New South Wales, as it apparently had been in many parts of California where no matrix veins could be found—namely, originally moulded upon the surface of vertical slate beds. I had on frequent occasions contended for the great importance of this fact in opposition to the views of our companion, Mr E. W. Rudder (now a country magistrate, settled on the Macleay River), who had held out for the exploded Murchison crotchet of an equable dissemination of gold in grains through the mass in granites. These opinions of mine I had especially urged upon Mr Hargraves when giving to him the letter respecting alluvial gold at Goodgood, where I knew that these slates existed in profusion, surrounded by every geological condition of auriferous promise, and where I had already ascertained that *the quartz-veins contained no visible gold.* The similar veins which I studiously examined at Wood's Creek, in California, in 1849, though they were situate in the midst of rich slate-moulded alluvial gold deposits, were quartz-veins equally goldless. The verbal instructions which accompanied my letter given to Mr Hargraves in California, were to make an examination of the slaty auriferous constants abounding in the districts of Maneroo, in the south, where I had resided, and on the Peel River and elsewhere to the northward, over which I had before repeatedly travelled, in addition to searching the country in the west, round about the auriferous quartz near Wellington, of the gold-findings in which I had only heard. Mr Hargraves, in the capacity of Crown Commissioner for exploration of the gold-fields in New South Wales, did afterwards examine all the districts I had mentioned to him when in California, everywhere demonstrating the existence of alluvial gold in free grains, and proving the system of Sir R. I. Murchison to be at fault; and it is not a little remarkable that over all the vast auriferous area which I had described to him from memory, the present diggings at Bingera, those on the Peel River, and others near Braidwood, are the only points yet proved to be centres of peculiar richness, thus singularly confirming the correctness of my first impressions that those auriferous parts of the colony which I had previously seen were, as a whole, of less gold-producing value than the prolific placers of California.

On the 12th of February, already mentioned, Mr Lister conducted Mr Hargraves to the goldless quartz-veins which traverse the bed of Summer Hill Creek. In these quartz-veins Mr Lister had before been fruitlessly mining and searching for gold in its stony matrix, but on washing the first dish of surrounding alluvium, these two practical champions of conflicting theories together just detected the presence of minute granular gold resting upon slate, and unquestionably confirmed for the first time in Australia the universality of those principles for which I had so often argued in California, when exposing in terms of ridicule the many impossibilities alleged to be scientific deductions. The few gold grains they obtained when prospecting together were felicitously described by the Colonial Secretary as being "visible under a microscope." Within two months from that date Mr Lister and two other companions found out (after Mr Hargraves had left them and returned to Sydney) that in the slaty receptacles along the bed of the creek coarse lumps of solid gold in very rich deposits were abundantly lodged. Thus did Mr Lister crown with success his two years of praiseworthy perseverance. My *ci-devant* partner, acting upon the plan arranged in California, had, in February, still continued to pursue his journey towards Wellington, where he had again found, at no great distance from the reputed quartz matrix gold vein, a very little, almost invisible, free gold in the alluvia, and thence he had retraced his steps to Sydney. Mr Hargraves, the first demonstrator in Australia of the anti-Murchison principles, did not, approximatively, prove the commercial value of any particular locality, either then or on any other occasion whatever. It was at this juncture of affairs that Mr Hargraves properly solicited employment from Government, according to a special agreement made between us in California; and it appears from published official correspondence that, in pursuance of what has been delicately termed "negotiations" with the Colonial Secretary, a pecuniary reward then first began to be contemplated. The Californian agreement referred to was partly cited before the Governor-General by Mr T. S. Mort, at an anniversary public dinner in February, 1853. While the negotiations were pending Mr Lister's labours culminated so brilliantly, and some experienced gold-miners lately returned from California being at the time in Bathurst, distant only thirty miles, hurried to the spot on hearing the news, and a rushing to the gold-diggings began in right earnest. But the valuable gold-bed discovered by Mr Lister at Summer Hill Creek, now named Ophir, is as remote from the auriferous quartz-vein near Wellington, as the rich diggings near Braidwood are distant from the auriferous land at Goodgood. Mr Lister, Mr Hargraves, and the two Messrs Tom, by uniting their labour, did not (before the retreat of Mr Hargraves) altogether collect more of the precious metal during the whole time (a period of several weeks) of their essays at alluvial gold-finding in the richest auriferous districts in New South Wales than the Rev. W. B. Clarke alone (according to his geological report of the 17th November, 1851) found at once upon my former sheep-run of Goodgood; and although clean alluvial gold to a large amount has since been obtained, both at Ophir and at Braidwood, yet neither in the vicinity of Mr Icely's auriferous quartz near Coombing, nor around the celebrated Macgregor quartz-vein near Wellington, has alluvial gold hitherto been found in available quantities. These are stubborn facts that prove the falsity of the Murchison quartz-abrasion assumption.

The great value of the Rev. W. B. Clarke's geological surveys is in no way impugned by these remarks. It is to be hoped that a comprehensive exposition of all the facts and physical phenomena connected with the gold-fields in Australia, collected to the date of present experience, may yet be issued by that recognised authority. A work of the kind will fix much floating knowledge, and consummate his justly-earned reputation. At Bendigo the gold-miners, thoroughly awakened to a sense of the absurdities of Sir R. I. Murchison, have lately united themselves into a scientific association; and the Victorian legislators, now that the diggers are incorporated with them, are just beginning to find out the necessity for a more truthful scientific book of reference on the subject than any they have been accustomed to consult. Such an undertaking, when accomplished, will bear other fruits than those within its present local sphere of usefulness; for contemptuously and illiberally as Colonial Councils have always treated such matters (a spasmodic generosity in favour of one practical applicant alone excepted), it is geological considerations that are the main guides in gold-seeking, notwithstanding that the false doctrines taught by the author of 'Russia and the Ural' have misled so many inquirers.

I beg of you to publish the unbiassed critique, uttered by William Howitt, the intellectually-gifted, highly-accomplished, gold-mining-experienced writer on Australia. Neither fearing nor favouring any man, this steadfast opponent of delusion and injustice, caring as little for Sir R. I. Murchison and his abject flatterers as for the official patrons of my quondam co-operator, deliberately delivers his own unprepossessed judgment upon my earliest documentary efforts to eradicate the preposterous fallacies once gravely put forth by the illustrious fossil-finder. The hieroglyphics moulded in metallic characters with the fidelity of printer's type on the rock-books where gold-diggers read their lessons, were certainly not deciphered aright by the geological explorer of the Uralian Mountains.

The novel theoretical views (already practically applied with the success I have related) were committed to writing for the purpose of bringing under the scientific consideration of the whole body of competent physicists, through the medium of Mr Hargraves, the various unknown facts and striking phenomena relating to natural gold deposits which had come beneath my own notice before the date of the two letters in which they are narrated. Those early papers generalising *de novo* a subject that much needed it, represented my own field labours and earnest investigation both of facts and of principles. They expressed my humble gropings after truth among the mighty works of nature, and detections of error in the artificial labyrinth fabricated by Sir R. I. Murchison. Without surreptitiously appropriating the sound opinions and acceptable conclusions of other theorists, the rugged sketches were written in strict accordance with the just rule "*Palmam qui meruit ferat*," the ambiguous motto—the warning advice so judiciously inscribed upon the gold cup presented to Mr Hargraves. The first two epistolary essays were caused to be printed in the 'Empire,' in order to secure the matter of them from unscrupulous pilferers—to prevent all jackdaws from "borrowing the plumes to which they had no right." They were penned after comparing the facts, gathered during a long gold-digging experience with the previously-printed records of eminent naturalists, whose names are duly mentioned in them. The sparks of truth connected together in a proposed new theory will probably soon kindle into a blaze of light, for other and abler naturalists (especially the "Retired Gold-digger") have since added to the theory (as subsequently improved) and suggested further corrections, but none have refuted the main points. Mr Howitt's amendments, and my remarks, will both contribute, I trust, to sustain the spirit of investigation amongst your numerous intelligent gold-digging readers, as well as to diffuse information, confirm doubted facts, and stimulate rational inquiry amongst all those other readers who have not enjoyed the advantages of a personal experience.

Sydney, 1st March, 1856. S. D.

Extract from LAND, LABOUR, AND GOLD. Letter XXXV. By William Howitt.

Forest Creek, Victoria, May 10th, 1854.

There is a class of hills, both here and at other diggings, which puzzle me, and which, I think, would puzzle the geologists. The White Hills of Bendigo, and the Red Hill here, are of this kind: they are composed to a great depth of a quartz conglomerate; that is, pebbles of quartz set in a cement of the detritus of these stones, ground to a very fine powder, and now grown as hard as the pebbles themselves,—so hard, that neither picks, nor gads, that is, steel chisels, have much effect on this substance, nor indeed anything but blasting. When you get down, perhaps forty or fifty feet, you come to as many feet of a soft white pipeclay, or pulverised schist, as white as snow, and with a satiny brilliancy. In this lies a stratum of quartz gravel and gold, and below these pipeclay again.

Now it is evident that all these substances have at some time been under water, and been subjected to a long and violent aquatic action, both from the worn roundness of the pebbles, and the trituration of the parts worn off into the finest powders, now hardened into cement. The gold found in the subjacent pipeclay is small, and water-worn. But all round the base of these hills, the strata, be they what they may—granite, sandstone, or slate—do not appear to have been acted on by water at all. They are clear, sharp, and solid, and any gold found amongst them is generally unworn by water, and frequently nuggetty.

It appears clear that those which are now hills were once basins of water; but by what peculiar phenomenon have just these basins been lifted up and made convex instead of concave, while all around them remains as it was? Why should what were hollows—just these places and no others—have become hills, or rounded mounts? It seems to me that it will still require a considerable series of observations, and much further reflection on the part of geologists, before this mystery can be cleared up.

Mr Simpson Davison, of Sydney—in two letters to Mr E. H. Hargraves, with whom he was associated in California; which letters have appeared in the Sydney 'Empire' and the Melbourne 'Argus,' and which he has done me the honour to forward to me—considers these quartz pebbles to have become rounded by rolling as they cooled. But, to my mind, there are many circumstances opposed to this idea. In the first place, it is not usual for things to roll up-hill. But here these rounded silicious pebbles or nodules exist in isolated masses, which are heaved up by some subterranean force above the level of the plane on all sides of them. There is no slope down which, or plain along which, they could have rolled, for they are considerably above the plane on every side. It is not to be supposed for a moment that in the act of projection from below they could cool into spherical forms. They would, under these circumstances, have cooled into one solid mass, as the quartz on the ridges or dykes mentioned have done.

In the second place, if they had been formed thus by rolling in a semi-fluid state, they would have exhibited a surface as bright as their interior. But their surface is opaque, like ground glass, while their internal fracture is bright, like that of quartz in general. Moreover, whence comes the cement in which they are set? This, no doubt, is the detritus from watery friction. It is contrary to all known laws of crystallization, that a huge mass of quartz or other stone should arrange itself in different forms under the same influencing agency. In fact, the rounded pebbles must have become rounded and set before they were thus piled into a mass, or they would, by their own weight, have been compressed into a solid compact body. They were clearly set hard before the interstices were filled up.

Of Mr Davison's theory of the gold formation in general, I may here state that I think he has approached nearer to the truth than any other geologist hitherto. He has ably combated the doctrine of quartz or schist being the matrix of gold. We have long, from our own observations, arrived at the conclusion that these substances are merely contemporaneous, and were thrown up at the same period and by the same subterranean force with the gold. The only particular on which I cannot bring myself to agree with Mr Davison is that of the gold or any portion of it having been held in chemical solution and deposited in a perishable lava by the action of alkalies.

We know of no agency except that of the old *aqua regia*, nitro-muriatic acid, which is capable of dissolving gold; but supposing some sufficient solvent to have existed in the interior of a volcano, we do know that gold precipitated from this solvent by alkalies would have been deposited in the form of an impalpable powder, and probably of a protoxide. But gold in Australia clearly the exhibition of a volcanic agency *is not* so found. It is everywhere in a pure metallic state, and frequently in extraordinary masses, as the 28lb., the 60lb., and the 136lb. nuggets of Ballarat.

That lavas as well as quartz were thrown out by the volcanic action, and that gold was diffused through them both is not only true, but the most familiar of truths on the diggings. I have just instanced a case of lava. But that all the gold found should be merely such as has been liberated from perishable lavas, as Mr Davison supposes, is opposed to all facts. As Mr Davison himself observes: "The gold in Victoria is nearly all found richly and thickly embedded on the bare rock;" the heaviest masses are usually there, and must have been laid there while the rock was quite bare, and therefore before decomposition had taken place on the surface so as to furnish drift matter. That the gold has been molten, and not chemically dissolved, every appearance of it, from the largest to the smallest grain, demonstrates; and in no shape more than in one to which Mr Davison again alludes: "The nuggets from the McIvor diggings appear as if one side was yet in a state of fusion, with the other side indented, as if just cooled upon a sandy or gritty floor." Exactly so. I have seen nuggets resembling a piece of paste dabbed down on a table, or pieces of lead run molten on a stone floor. You could not be more convinced that they were thus thrown up in fusion from some lower region of the earth and thus cooled, if you had seen it done.

If, therefore, we leave out Mr Davison's theory of a perishable lava, and accept it only as a partial adjunct, and suppose instead that when the gold and quartz were thrown up from below by volcanic agency in a state of fusion, the same agency broke and threw up extensive strata of clay slate, sandstone, and other perishable substances, and through which good quantities of the molten gold was diffused, we seem to me to have every recognised element necessary to the production of the existing phenomena.

These slates, sandstones, and other perishable substances holding gold being thus brought to the surface (where they are in places so conspicuous near those perpendicular dykes lately described), have gradually undergone decomposition from the action of the atmosphere and of rains, and thus by degrees liberated the gold which has been washed into the streams and valleys. This action is still going on, and therefore, after fresh rains, you will often find gold deposited in the roots of the weeds and shrubs in the creeks.

A most striking proof of the [illegible]ult of the gradual decomposition of the surface we found in the creek which we worked at the Upper Yackandanda. The gold was found in the mud of the creek, resting on a stratum of clay, at about a depth of two feet. But on digging through this clay we found fresh drift of three feet deep, which must have been the accumulation of centuries. Neither in that, however, nor on the rock beneath was there the slightest deposit of gold. It was quite evident that the gold had only begun to wash into the creek from the surrounding slopes at a comparatively recent period, because these slopes had only then begun to undergo decomposition.

Two facts in Mr Davison's letters do not accord with my own experience. I have never seen much gold in trap formations, though it is an important question whether gold may not yet be found beneath surface traps. That "very hard quartz-veins are usually level with the surface, and are rarely found a few feet high," is singularly in opposition to the gigantic quartz-rocks which I have described at Bendigo. These assertions, however, do not affect his main theory, which, with the exception of the precipitation of the gold by alkalies, and "the perishable lava" as a *universal* medium, approaches nearer to a solution of the gold mystery than any yet proposed.

It is due to Mr Howitt to remark that, owing to several technical inaccuracies on my part expressed in the first copies of the two letters which he criticises, he appears to have misunderstood that in some cases a precipitation of the metal from aqueous solutions at low temperatures was intended, when in reality the context is sufficient proof that the theory altogether is meant to convey the idea that gold in globules had been originally thrown to the bottom of some surface-spread molten liquid in a state of incandescence, heated above the melting point of gold, and therefore not at such a low temperature as would suffer the deposition of the metallic separations in an impalpable powder. Many other of Mr Howitt's objections have already been treated of, and need not be here repeated; but there is one consideration urged by him *against* the theory, which is, I think, especially *favourable* to it—namely, that quartz, if it had overflowed in a liquid and igneous state, would have cooled into a solid mass, as the vertical quartz dykes have done. Now, since there is in Nature *no solid quartz horizontally deposited in hollows with gold at the bottom*, this particular objection of Mr Howitt's is the strongest argument (if it be first admitted that molten gold has overflowed) in favour either of the presence of a third hypothetical liquid having prevented the supposed overflowing quartz from solidifying into a compact body, and therefore caused it to assume spherical forms after its emission, or else of its solidification in spheroidal shapes being due to some other cause; while the different conditions might nevertheless have been such as would have allowed liquid quartz in the fissures to coalesce into a solid mass, as it now exists in them (see seventh public letter). The same phenomena might, I suppose, be produced artificially with these three substances—melted fat or wax globules, quicksilver, and a larger volume of water—issuing slowly at a gradually cooling thermal temperature through a small fissure, and overflowing at the same time. The out-issuing fat globules would solidify in spheroids; those retained in the fissure would be a solid mass, encasing some quicksilver globules, while the third liquid (water) would entirely disappear. That quartz pebbles have solidified originally in rounded shapes is a sequiter to the first proposition that gold has been moulded on the floor when in a liquid state. That the laws of crystallization are opposed to an arrangement of quartz or other stone in different forms under the same influencing agency, is scarcely an applicable objection, since the agency in the case in question does not continue the same—both temperature and pressure being obviously very materially different under the two hypothetical conditions, while *different* substances, it is well known, will assume, according to their different properties, either the angular or the globular form on solidifying under precisely the same cooling conditions.

The quartz rocks at Bendigo, which Mr Howitt describes as standing like walls twenty or thirty feet high, are doubtful as to being *of the auriferous kind*; but waiving this doubt, and allowing that height to be the maximum of which quartz-veins crop out of the ground, they would be comparatively but a few feet high. I had in view, at the time of making those remarks, the arguments of a writer who stated that Humboldt had found in South America quartz rocks 6,000 feet high, and thence it followed, he said, since quartz rock is the matrix of gold, often quite invisible, that an inexhaustible field was open there for quartz-crushing companies to operate upon.

Mr Howitt, the Retired Gold-digger, and to these I may add (I trust without any breach of confidence) the privately expressed opinion of the Rev. Mr Clarke, all suggest (while accepting the broad principles) that in the theory I have propounded of an igneous overflow to account for placer-deposit gold being moulded on the floor, too much importance has been assigned to a third perishable agent, and to the relative quantity of the metal which has been so deposited; that is, they would of the two attribute more importance to a subsequent destruction of veinstones to account for the dispersion of alluvial gold. This concession may be provisionally granted without any great damage to the correctness of my theory—the question being one of principle rather than of proportion. The principle of an igneous overflow is not, as the Retired Gold-digger expressed it, "an important secondary cause," but a primary and fundamental consideration, although the relative proportion of the metallic deposits, originated by an actual overflow, may or may not be secondary in its importance to the quantity of gold since released from veinstones by their destruction. It was upon the fact and the principle of placer-deposit gold being moulded upon slates, and of not being disseminated in the massive rocks previously enumerated, that the inference of the same conditions existing in Australia (where I had already examined the geological features over a great extent of country) was founded, and in consequence of these newly-discovered data, I wrote by, and directed Mr Hargraves to make the required experiments when he should land in Australia from California.

In lieu of offering any explanation in the public prints for the ungrateful return of having left unnoticed (both in the late book and in every previous public document) the letter which I had written for him when in California, concerning gold in Australia, as well as of having neglected to render any public account of his examinations for gold at Goodgood and Cowra, subsequently made by him when acting as Crown Commissioner for Exploration, Mr Hargraves caused the following communication to be inserted in the 'Herald,' and by a remarkable coincidence the subjoined anonymous letter appeared just beneath it in the journal of the same day.

Sydney, N. S. W., 25th Jan. 1856.

SIR,—I have the honour to acknowledge the receipt of your letter of the 9th instant, in which you acquaint me that the sum of 2,381*l.* had been awarded to me by his Excellency the late Governor, out of a sum of 5,000*l.* voted by the Legislative Council to myself and other discoverers of gold in the colony of Victoria, and to request that you will allow me, through you, to acknowledge the obligation his Excellency placed me under by the mode of distribution he adopted.

I cannot, however, address you on this subject without expressing my astonishment and regret, that, while the colony of New South Wales awarded me the sum of 10,000*l.* for my discovery so far as it affected that colony, the colony of Victoria, which was benefited to so much greater an extent, and was raised from a depression that had for years paralysed its exertions to affluence unprecedented in the history of the world, should have placed on my discovery so inconsiderable and inadequate a value. I have the honour, &c.

E. H. HARGRAVES.

To the Hon. the Chief Secretary, Melbourne.

To the EDITOR of the 'HERALD.'

SIR,—A few days ago the directors of the Sydney Infirmary published a list of donations, to invite contributions from those who may have overlooked the claims of this institution. On perusing the list it occurred to me that the name of one individual is omitted upon whom the directors of this and of similar charitable institutions have a just claim for a considerable sum, and which, owing probably to inactivity in collection, I presume that they have not yet obtained.

It may be remembered that, when upon the motion of Mr E. Deas Thomson, upwards of two years ago, it was proposed in the Legislative Council that the gold gratuity to Mr Hargraves should be increased to 10,000*l.*, there appeared in your columns a letter signed by the latter gentleman, pledging himself to distribute 1,000*l.* among local charities, in case the larger sum should be granted to him. I have sought in vain from time to time to find out the way in which this amount has been apportioned, or is intended to be distributed.

A *douceur* promised to an official, contingent upon the success of his special pleading, may be justly repudiated as being morally wrong;

but a promise of charity voluntarily offered to influence the liberality of a Legislature is wholly different; one speaker only declared that his vote was not determined by the professed benevolence,—no doubt many honourable members gave due weight to the declared charitable intention.

I humbly hope, then, that I am not wrong in regarding this sum as public money, held in trust by Mr Hargraves, especially devoted to the charitable institutions of New South Wales, and which, like State revenue, bank returns, or other public matter, ought to be publicly accounted for—should it have already been disposed of without publication.

Bis dat qui cito dat—in case the sum of 1,000*l.* has not yet been divided, I submit (I hope without unwarrantable presumption) that 250*l.* would be a fair proportion to the Sydney Infirmary, and that the directors should respectfully solicit that amount.

I am, Sir, &c.
JUSTICE ROBERT SHALLOW.

At the time when my letter on Mr Howitt's critique appeared, the Rev. Mr Clarke (whose personal acquaintance I had but very recently made) had been lately attacked with sudden and serious illness, and I had, therefore, in courtesy sent him a copy of it, with a note expressing a hope that none of my remarks in it were annoying to him. I received the following letter in consequence, and accordingly sent to the same journal the annexed explanatory letter relating to his geological surveys.

Parsonage, St Leonard's, March 5, 1856.

MY DEAR SIR,—I am not able to enter now upon the subject of your letter, as I am prohibited from all mental employment. I gave your printed letter in the 'Empire' such a hasty perusal as I was able, and regret you put in the word *only* in the passage about my having seen your letter to the BARON. The fact is, Goodgood came in the regular course of my exploration, and would have come on whether I had heard of your letter to him or no. As it stands the reader must consider I had tried, and failed till I had been told the exact locality, whereas, I was never there before nor after, and I do not know whether I was on your run at all, though on the creek. I wish you would write a few words to the 'Empire' to explain this; it will serve you, too, much better. I am ordered away by the doctors, and either to V.D.L. or to Europe. I hope to see you before I go away, but I have not been out of my chamber since Easter day.

Yours truly, W. B. CLARKE.
S. Davison, Esq., Belmont villa, Sydney.

To this request I immediately replied publicly, as follows:—

SIR,—Permit me to explain, with reference to my letter in your issue of the 3rd instant, that in stating "the Rev. W. B. Clarke discovered alluvial gold upon my former sheep run of Goodgood only after Mr Hargraves had shown my letter to him," I do not intend to insinuate that the Rev. Mr Clarke was induced to examine Goodgood solely in consequence of having seen that letter—the order of sequence in which his geological reports are written clearly show that Goodgood came in the regular course of exploration.

But I beg publicly to express my gratitute to him for the honesty and fairness manifested in his official report of the 17th of November, 1851, in which (after he had learnt the purport of my letter) it is stated that he had no difficulty in obtaining gold in every dish at a certain part of the Goodgood River, and that he had reason to believe the precious metal had then been recently found in the vicinity in such quantity as in those days was regarded as being "in some abundance." The letter referred to was written in California before any alluvial gold whatever had been obtained in Australia by washing the earth, and but for the Rev. Mr Clarke's report upon Goodgood, I might yet have remained entirely ignorant of its signal success, and left unexplained the ideas of which my letter was but the outward sign, for I have never been able to find Mr Hargraves's report upon the places to which I had especially directed him, though I have understood that he too examined Goodgood in 1851.

Although Mr Edward Deas Thomson, the then Colonial Secretary, regarded the *ipse dixit* of money claimants as sufficient evidence respecting the gold discoveries, and consequently declined to hear me, before the Gold Committee in 1853, yet I had supposed that in 'Australia and its Gold-fields' this very important document of mine would, in common justice, have occupied the most conspicuous place in the publication, but since the letter is not even alluded to in the little book, I can now only express my astonishment and regret that while my experience and reasonings aided so materially "in raising the colony from a depression that had for years paralysed its exertions to affluence unprecedented in the history of the world," the author of that little book should have placed upon my letter so inconsiderable and inadequate a value as not to deem it even worth mentioning.

I am, Sir, yours, &c., S. D.

Part Eleventh.

OFFICIAL INQUIRIES INTO THE STATE OF THE GOLD-FIELDS.

THE Royal Commission appointed after the Ballaarat Rebellion, to inquire into the state of the gold-fields, having more reference to political objects than to those of gold production, the conclusions of its report are reprinted in Appendix C ; but after admission of gold miners' representatives into the Legislative Council (consequent on the change of Government brought about by the gold-diggers' revolt), a select committee of its members was nominated during the following year, "to consider upon and recommend the best mode of developing the mineral wealth of Victoria," and issued a report in 1856, signed by the chairman, Mr Humphray, the representative of a gold-digging constituency, as follows :—

> That your Committee, having taken the evidence of a number of gentlemen of high scientific attainments, have now the satisfaction of being able to present to your Honourable House a mass of information and suggestions upon the matter of inquiry of the most interesting and valuable character, and are convinced that the practical results derivable from a proper attention to the same would confer a great and lasting benefit upon the colony. The subject, however, involves inquiry of such magnitude that your Committee could do little more in so short a time than initiate the investigation, and now leave the matter with a strong recommendation to the new Legislature to pursue it in a manner worthy of its importance.

That the question presented for the consideration of your Committee may be divided as follows:—

1. The necessity for instituting a scientific inquiry into the extent and physical features of the auriferous lands of the colony of Victoria, by making topographical, geological, and mineralogical surveys of the same, and laying down accurate charts, distinguishing thereon the auriferous from the arable and pasture lands.

2. To ascertain from the most reliable sources the present mode of mining, and examine the machinery at present in use on the Victorian gold-fields, and the proportion between the estimated amount of labour bestowed and the aggregate yield per man engaged in mining operations.

3. To inquire into the best mode of developing the auriferous and other mineral wealth of the colony, and how far the Government may practically aid the miner through the agency of scientific instruction, in economising labour, time, and money.

4. Whether Government assay and bullion offices in Melbourne, and especially on the principal gold-fields, would be profitable to the producing miner and advantageous to the public generally.

5. The necessity for establishing a Mining Board to carry out this important inquiry, the said Board to form hereafter a separate department in the Government of the colony; also the establishing of a Mining and Mechanical School, with a museum, laboratory, and exhibition rooms attached.

That from the evidence taken before your Committee it appears that it is impossible to over-estimate the public value of the surveys and investigations forming the subject of this inquiry; and although a large outlay of money will be required to carry out the matter properly, the immense benefits, however, which would be conferred thereby upon the whole colony, it is respectfully submitted, forms an ample justification for such productive expenditure.

That America, which has credit for being the most economical Government in the civilised world, has expended very large sums of money in making topographical, geological, and natural history surveys on the most comprehensive scale, and which surveys are superior to those elaborated by any Government of Europe, and results of great practical value have in all places followed from such proceedings.

That your Committee are of opinion that, under the peculiar circumstances of this new country (having so large an extent of unsold land), these surveys and investigations should be proceeded with without delay.

That correct data may thereby be ascertained, indicating the source and course of the great auriferous deposits of the country, and the bearings of our quartz reefs; such information, if obtainable, will be invaluable to the practical miner.

That these surveys would furnish materials for accurate charts, distinguishing the auriferous from the arable and pasture lands, and thus lay the basis of future legislation for the disposal of the public lands of the colony, and thereby avoid some of the difficulties suggested in the discussion relative to mining upon private property, and preventing the sale of auriferous land by mistake in future.

That the geological survey will supply us with a knowledge of the peculiar features and characteristics, and reveal the existence and locality of the vast mineral deposits of this new country; and your Committee regret that the geological surveys have not been carried out in this colony on a scale commensurate with their value, and trust that the work under this department will receive a sufficiently liberal support, that it may be followed up with vigour.

That a mineralogical survey may, in gold-mining, render great service, especially in the deep sinking, aided by mechanical borings; in cross sections the "leads" or "gutters" may, by such agency, be discovered at a much less cost of labour, time, and money, than the present tedious methods of sinking, by which so much labour is thrown away.

That your Committee would venture respectfully to record their opinion that it is incumbent upon the Government to foster and encourage in every possible way a thorough reform in our mining system; and would recommend, that in order that this country should progress in the same ratio as her material wealth, the energy, enterprise, and intelligence of her people warrant, wise and liberal laws founded upon a practical knowledge of mining and miners should at once be introduced, and the utmost care taken in the selection of proper men to administer them: that science, with its grand and powerful agencies, should be brought to bear upon our gold-fields, as there is work for the geologist, the mineralogist, the machinist, the mining engineer and metallurgist; and that these levers to our national progress may be advantageously employed to work out the projected scheme, there should be some central supervising power; and your Committee recommend for this purpose the appointment of a Mining Board, with corresponding branches on the principal gold-fields, who will, from time to time, send out a number of gentlemen of the necessary practical scientific attainments, to make a thorough inquiry into the state of the gold-fields, to examine the physical characteristics of the same, the modes of mining, the number of miners actually engaged, the productive results, the relative yield of gold to the labour bestowed, the different kinds of machinery employed, noting the efficiency or otherwise of each distinct machine, either in a mechanical, scientific, or economical aspect. This, combined with the projected surveys, will be productive of results of great value to the miner and the public generally.

That your Committee are convinced that very much of the mineral wealth in the reach of the ordinary miner is now thrown away or overlooked through the ignorance or carelessness of the miner. It has long been known to science how to extract gold from quartz; but it has yet to be discovered how to apply that knowledge sufficiently economically to make quartz mining remunerative to small companies to any great extent; your Committee have taken some evidence on this branch of mining, but consider it unsatisfactory. It is generally admitted that but a portion only of the gold is obtained at present by the miners, in most instances either from quartz or the alluvial soil, as the very fine gold requires a far more delicate manipulation than the mode which at present obtains. Mechanical and chemical agency may remove much of the evil complained of. The ignorance of the miner of his true interests, and his objection to a more general association of labour, and the fair and equitable introduction of labour, is fast disappearing, and a new era dawning upon your mining community.

That your Committee are fully aware that much prejudice prevails against the introduction of machinery and the establishment of gold mining on a scale commensurate with the difficulties which isolated mining has suggested, but this prejudice is dying out in the same ratio as ignorance is being removed and better regulations introduced; l it cannot be denied that the individual miner has hitherto had j grounds to be jealous of any infringement upon his individual rigl and this is likely to remain until a more comprehensive and suita code of laws are framed for the gold-fields.

The legitimate and timely aid of capital would not only prevent t ruin of thousands of industrious miners, but would frequently seci an independent fortune to them; but as the law now stands there neither the requisite protection to the individual miner or t capitalist.

The Committee included in this document some "pleasin anticipations by a Mr Brache, founded upon "assumed data but why Mr Brache's pleasing lucubrations should find a pla in the report in preference to the equally pleasing antici tions upon "assumed data" expressed long previously by t notable John Calvert, and many other pleasing predictors, that the former are in any way more probable than the lat does not appear upon the face of the report. The reader w now, I trust, be "pleased" to have the passage presented him:—

Your Committee are glad to find that, according to the supplem tary evidence of Mr Brache, there is little fear of our gold-fields be exhausted for many centuries to come; but your Committee think hardly necessary to state, that they can only receive Mr Brach statement as a pleasing probability, inasmuch as his deductions drawn, to a considerable extent, from assumed data. Mr Bra has, however, with ability and considerable industry, investiga the subject extensively, and has arrived at the following conc sions: He estimates the auriferous lands of the colony to be 20 square miles, including 200 square miles of quartz-reefs; that th are 20,650 millions of tons of quartz, which would take 100,000 min 300 years to work up. Estimating its value as low as 1*l.* per ton would give the enormous yield of 62,000 millions sterling per ann allowing 10,000 companies of ten men each to quarry and crush twen four tons per day. That he further estimates the alluvial land 20,444 millions of cubic yards, and if worked up by 100,000 miners the rate of 90,000,000 of cubic yards per annum, would take 2, years as the time required for exhausting our alluvial gold-fie giving a yield of 24,000,000 sterling per annum; that is, valuing i 6s. per cubic yard, it gives the total of 6,133 millions sterling as value of our auriferous alluvial deposits. Adding to this the estima value of the quartz at 20,650 millions sterling per annum, it gives grand total of the estimated auriferous wealth of the colony of Vict at 26,783 millions sterling!

That it is quite clear that if our yield may be increased fi 12,000,000*l.* to even double that sum by an equal or far less amoun labour, and the united evidence taken before your Committee show can be done by more systematically working our gold-fields. If s is high time that an improved system should be put into operation, the co-operation of the Government is needed in various ways, sucl the appointment of thoroughly qualified mining engineers to act instructors and guides of the working miners; the value of such practical instruction in mining engineering cannot be over-estimated.

The next authority quoted by the Committee, in contrast to the above, is that of Professor M'Coy, a scientific disputant of old date with the Rev. Mr Clarke on the question of the geological date of the coal measures in Australia, and lately acting as scientific referee for the Government in Victoria. His opinions are thus stated :—

> Your Committee deem it of the greatest importance that a public museum should be established for the reception and exhibition of mineral specimens which may be collected by the surveyors, or which may be presented by the miners, as, without such a museum, having also the necessary apparatus, the result of the most careful field survey alone would be unsatisfactory. Professor M'Coy speaks strongly on this point. The learned Professor says:
>
> "I believe, however, from my experience, that whenever a government employs scientific men and sends them into the field to observe, they make observations and send them in considerable apparent detail, but when they come to be investigated afterwards, either by a person of superior attainments, or even by the same person, with more accurate resources, in the closet, it will be found that the field determinations being of a hurried and imperfect kind, are very often erroneous. Now, if it be permitted that a mineralogical surveyor or a geological surveyor goes into the field and observes some particular mineral, and throws the specimen away upon his own individual authority when he has looked at it, it will be found, as it has been found in the geological surveys of the old countries, that the result of such labours is a large portion of the national money thrown away; that you can never trust implicitly to results so obtained, nor can the word of the most scientific man in the field be worth much, from the hurry and imperfect means of examination used there. He must bring his specimens, whatever those specimens may be, home to his laboratory or museum, and examine them where he has his books and appliances and philosophical instruments to compare and test them accurately, and then write the determination down. For this reason it is absolutely necessary that there should be a museum established, in which every special specimen might be deposited, and having been properly tested, be accurately inserted by name on the map, and there it should remain for reference whenever any question in regard to it or to a similar material should arise. That I look upon as a thing that ought to be done without loss of time. It is of the utmost importance in relation to those investigations, and it is the only way, in my mind, by which you can give confidence to the public that the work will be properly done. I would also add to my description of this museum which I propose, that there should be in connection with it a small laboratory with a set of chemicals, analysing or testing apparatus, to furnish elementary instructions for ordinary miners, to enable them by cheap implements (such as a simple blow-pipe as big as a tobacco pipe, and eight or ten tests, costing as many shillings) to test the nature of all ores which might occur to them in the course of their labours on the gold-fields."

The following paragraph appeared the most equivocal passage in the report, for whether it be intended as a reproach to the Government for the past, or merely as wholesome advice for the future, can only be surmised:—

> That your Committee, being impressed with the importance of the investigations to be carried out under a mining board, would venture to urge that the greatest care should be taken in securing the services of the right man, as a mere theoretical or fashionable inquiry would be worthless for all practical purposes. There must be a personal inspection of the gold-fields by gentlemen possessing the required scientific attainments and experience, whose report will have the stamp of accuracy, and which may hereafter be consulted as an authority and guide upon the subjects investigated, forming a history of our material resources, physical condition, and social progress.

There may, however, be gathered from the above recommendation, the opinion of the Committee that none but "the right man" to be sent at the public expense to gold-fields already opened, ought in future to be allowed "to theorize," —that Professor M'Coy and men of science, or at least "gentlemen of the required scientific attainments," with the aids of personal inspections of the gold-fields, a museum, and a laboratory, are hereafter to be licensed to frame "theories," —to explain in what part of the earth the gold required to be developed yet remains deposited,—for this is the chief object and argument of the report, and this is, in fact, THEORY. Professor M'Coy has, I have been privately informed, lately advanced a new hypothesis, or rather newly applied an old one, to account in part for the apparent great destruction of gold-bearing quartz veins on the Victorian gold-fields. He would refer their destruction to ice. Now, many of the phenomena in Victoria would probably be better explained by the assumption of ice as a perishable agent of destruction of perfectly solidified gold-bearing quartz veins than either water or slow decay. It is also remarkable that the recent geological date assigned by Murchison to the deposit of the auriferous drifts corresponds with the recent date which is assigned to the glacial epoch by those geologists who have faith in the theory of a glacial period having once existed on the earth,—that is, at the period when other geological phenomena are apparent which the glacial theory seeks to explain. At the gold-fields in Victoria the perfect rounding of the quartz pebbles so near to the gold-bearing veinstones may be better explained by an agent of so powerful a grinding power as ice than by water; the deposit of gold in "leads" has also some resemblance to the "moraines" of the glacial theory, and even some slight

adaptation of the metal to the floor might possibly have
effected by an agent of such tremendous pressure and gri
power as would be produced by enormous masses of ic
moraine or slowly moving flood of ice would be at o
powerful abrading agent, a limited transporting power,
perishable substance. Still in its best aspect this conject
only one of many *destructive agents,* and does not embra
question of formation which is essential to a theory; and
is not, that I am aware of, in Australia any collateral evi
in favour of a glacial epoch ever having appeared.

Since the legal right had been conceded to the gold-di
to frame their own local mining regulations a number of
offices had been created for the gold-fields, under the na
" wardens;" these may be described as local trustees fo
Crown of the gold-deposits; the new appointments were c
bestowed on the late Gold Commissioners, whose numbe
lately been reduced. The next special Commission of In
into the state of the gold-fields in 1857 consisted of Pro
M'Coy the scientific referee, Mr Selwyn the Gover
geologist, and Mr Gold-Commissioner Panton, now one o
Majesty's wardens. Seven years had by this time elapsed
my individual examinations were made in California, c
questions treated of in the following Report, and no
length, after scientific and circumstantial examinations,
Mining Commission have recorded just about the same
rical conclusions, the first being that the horizontal exte
of the gold beds is a matter of primary importance, an
second, that the gold-bearing quartz-veins are of more do
value as the depth increases. The Commission thus rep
on the EXTENT AND PERMANENCE OF GOLD-FIELDS:

> The question of the extent and durability of the gold mines
> colony is one of such interest, that the Commissioners feel bo
> offer some remarks upon it, more particularly as the Governme
> the public have received the most opposite opinions on the su
> some authorities stating that they would be matters of history in
> years, and others that it only needed more machinery, "and to g
> enough," to develope unlimited quantities of gold for any len
> time. The evidence of Professor M'Coy before the select com
> of the House on gold, to the effect that auriferous drifts must obv
> from their nature be quickly worked out in any one spot, and th
> perience in every country proved that the yield of gold decrease
> the depth after a certain small limit, when mining in the solid
> was attempted, was objected to on the ground that Australia
> anomalous that geological induction probably did not apply. The
> missioners have taken great pains to investigate these points
> gold-fields, and the result has been the most complete confirmat
> the evidence alluded to. Many of the old alluvial gold-fields,

prosperity when that evidence was given, are now comparatively deserted, and there can be no longer any difference of opinion relative to that class of gold deposits. With regard to the evidence touching the yield of gold from deep mining into the quartz reefs, concerning which there was the greatest scepticism, the same result has followed the local inquiries of the Commissioners; and out of a large body of evidence most completely proving the accuracy of the views expressed to the committee, the following few facts are selected as being within the personal knowledge of two of her Majesty's wardens, Messrs Panton and Dowling, viz.:—Maiden Gully Reef had the gold on the surface and in large quantities at first sinking, but entirely failed on reaching a depth of thirty-five (35) feet. Job's Gully Reef also had gold on the surface, and it increased to a depth of about thirty (30) feet, beyond which it gradually decreased, and entirely ran out at a depth of one hundred and ten (110) feet. Pleasant Creek Reef, very rich in gold near the surface, forty-five (45) ounces of gold having been obtained from one hundred (100) pounds of quartz at a depth of ten (10) feet; but as the sinking increased the gold decreased. "Jones's Creek Reef," rich on surface and to a depth of twenty-five (25) feet, after which it gradually became poor. "Peep of Day Reef," in Robinson Crusoe's Gully, was very rich from surface to fifty (50) feet, after which the yield was so small that it was abandoned at about seventy feet. "Specimen Hill Reef," at the head of Long Gully, paid from twenty to thirty (20 to 30) ounces to the ton near surface, but little is found at a depth of seventy (70) feet. "Butcher's Gully Reef," richest from surface to twenty to thirty (20 to 30) feet, but the gold entirely ran out at seventy or eighty (70 or 80) feet. "Hustler's Reef," in Iron Bark Gully, exceedingly rich at surface, lessened at greater depth, and beyond sixty (60) feet the yield of gold was small. "Ballustead Reef," very rich for about sixty (60) feet, after which the yield gradually decreased, and although followed for upwards of two hundred (200) feet, little or no gold has been found at that depth. "Crawford's claim," at the head of Peg Leg Gully, exceedingly rich on the surface, and for a depth of about ten (10) feet, beyond which no gold was found. These examples might be greatly multiplied, but enough have probably been given to vindicate scientific inductions; and while the Commissioners would caution capitalists against the erection of such great permanent mining buildings on a gold-quartz reef, as would be judicious on a copper lode for instance, they would yet congratulate the country on the fact that although in any one spot the gold deposits will soon be worked out in a vertical direction, the horizontal extension of these beds and veins are immensely greater than people are yet aware of.

It is but fair to present here the following statements and opinions on the other side of the question, as published in the colony immediately after the public appearance of the foregoing Report:

From the Weekly Circular of Mr Thomas Carpenter, Bullion Broker, dated Union Bank of Australia, Bendigo, 12 Dec., 1857.

Quartz mining is no longer an uncertainty, *i.e.*, provided that it is carried out and worked on well-known practical principles. Many of our quartz reefs have been worked to various depths, and the richest claims are found at the greatest depths; more particularly those on the Victoria and Johnson's Reefs, the former 200 to 240 feet, the latter 180 to 200

[illegible]

[illegible] the recognition and establishment of the profession of scientific and practical mining engineers and surveyors; the organisation of an efficient mining department as a separate branch of the Civil Service, to be presided over by a responsible minister of the Crown with a seat in the Legislature; the establishment of a mining museum, and also of a mining school; the erection of suitable buildings, with assay rooms, workshops, museum, library, &c.; the introduction of a better system in the survey of mineral and auriferous lands; and the appointment of a special Commission to inquire into the most pressing wants of our mining community, with a view of having them supplied and relieved; and then to proceed on a visit to the principal mining countries abroad, for the purpose of ascertaining the policy of foreign governments in promoting the mining interests of each, and of opening a correspondence with the best informed mining authorities. It will also be part of the duty of the Commission to inform capitalists and professional men of the vast field this colony affords for the investment of either capital or skill under better regulations than now prevail.

Part Twelfth.

THE AURIFEROUS VEINSTONE NEAR WELLINGTON.

One of the principal questions considered in California, when the discovery of placer-deposit gold in Australia had been in contemplation, related to the course which the local and Imperial Governments might pursue with respect to granting freehold and leasehold titles to auriferous lands in the colony, when their wide-spread auriferous character should be made known. The Californian system of occupying small claims for gold-mining in alluvia, without any express permission from their own Executive or Legislative authorities, resulted from the republican habits of the people quite as much as from the circumstance of the gold-washings there having been commenced by a multitude of persons before the requisite local functionaries for the maintenance of law and order had been established. But the Australian colonies were differently situated. Their established institutions were essentially less republican. Local authorities were already in office. The residents generally had much less impatience of magisterial control than the Anglo-Americans; and it then seemed to us a doubtful question whether either the Colonial or Imperial Government would readily sanction in Australia the same system of small occupation of gold-mining claims as prevailed in California. The squatters in New South Wales were already the exclusive proprietors of valuable grazing privileges, such as did not exist in America, and hence might not also the gold-mines, if discovered, be similarly granted in large portions? The placer-deposits of gold would certainly be better worked in small claims by independent labourers, but then the auriferous quartz-veins, requiring expensive machinery and the systematic application of industry, could, as was thought, be more advantageously worked by their allotment in larger grants, with the security of leases or freehold titles for them. The gold-mining regulations at first adopted by the local Government of New South Wales were, therefore, framed upon these considerations, and they provided small occupation claims for the one kind, and upon certain conditions offered large leasehold grants for the other.

Many of the present freehold titles to large tracts of land in the Australian colonies originated in promises of grant in the earlier days of the settlement solely upon conditions of improvement—conditions which were, nevertheless, frequently evaded without forfeiture of tenure. To many of the large freeholds in that part of the Mexican territory which became ceded to the Federal Government of the United States at the conclusion of the war, and since become so well known as Alta-California—titles under similar conditions of improvement had been originally obtained when under Mexican control. In Hispano-America generally the conditions upon which titles to land had been promised had resulted in their acquisition without these conditions being literally complied with. The first amended regulations for leasing auriferous lands for quartz-mining in New South Wales provided for their grant upon certain conditions of occupation and improvement which were so contrived that, upon the payment of fifty pounds, one person could hold a quartz-mine for no longer term than one year, except by erecting upon the conditionally-promised land a given amount of machinery, after which the Government undertook to issue a lease for twenty-one years. The Executive Government, however, reserved to itself in making the first promise of lease very full powers, and by renewal of application in different names an association having the good-will of the Administration might renew the claim to an almost unlimited period of time.

The *sale* of auriferous lands had at first been most properly disallowed altogether, but when the great extent of them became apparent, it was found impossible in every instance to exclude agricultural land from sale and occupation, because some small quantity of gold had been found upon it. However the sales of land known to be highly auriferous, in short the sale of the placer-deposits themselves, at length began to assume an alarming aspect in the eyes of the gold-diggers, and in Victoria especially, numerous petitions and protests proceeded from them relating to this grievance.

In the introductory narrative I have mentioned my application to the Government for the auriferous veinstone near Wellington. The annexed two official letters informed me of the Governor-General's approval of the grant to me of a lease for a term of twenty-one years of the two half-mile sections which I had, upon my own judgment, selected from the entire vein as being the most valuable part of it :

Gold Commissioner's Office, Bathurst, August 11, 1854.

SIR,—Referring to your application of March 13th for two portions of the Macgregor quartz-vein, I now do myself the honour to inform you that his Excellency the Governor-General has been pleased to approve of these two claims being granted to you.

I beg to remind you that it will be necessary to send in the names of your sureties, for the due working under the regulations of these claims, within two months from the date of acceptance.—I have, &c.,

CHAS. H. GREEN, Gold Commissioner, Western District.

S. Davison, Esq., Sydney.

[Date of acceptance of application, 25th July, 1854.]

Gold Commissioner's Office, Bathurst, October 27, 1854.

SIR,—With reference to your letter of 23rd ultimo, transmitting, for the approval of his Excellency the Governor-General, the names of the persons entered in the margin as bondsmen for the due payment of the Royalty on any gold extracted from the quartz claims granted to you at Mitchell's Creek, I now do myself the honour to inform you that his Excellency has been pleased to approve of the parties named being accepted as your securities.

I have, therefore, requested the Civil Crown Solicitor to prepare the necessary bond. I have, &c.,

CHAS. H. GREEN, Gold Commissioner, Western District.

S. Davison, Esq., Sydney.

[Names in margin, Messrs John Keele and Thomas Beames.]

Before any operations, however, had commenced upon the leasehold mining land to which the preceding communications relate, the following paragraph in the public prints accidentally caught my attention in Sydney, upon the very day when the sale which it advertises took place in the district where it is situate, the remarks of the writer being thus included under the item of 'News from Wellington:'

Although the existence of gold in New South Wales was known for many years past to a few scientific men, yet it is generally admitted that Macgregor was the first person who found it in remunerative quantities. In the scramble for notoriety which occurred several years subsequent to Macgregor's success, his claims were overlooked or set aside by those who laboured through the press and elsewhere to enforce their own demands; and he, being a man of humble position and of unobtrusive habits, made no endeavour at the time to establish a priority so justly his due. Macgregor, now a wealthy man, was formerly a shepherd in Mr Montefiore's establishment at Wellington. His flock fed over lands situated on Mitchell's Creek, and possessing a geological turn of mind, and, from the nature of his occupation, abundant leisure to prosecute research, he was led to break up and examine portions of a quartz-ridge which traversed his sheep-run. During this investigation he met with a metal (amongst several others) which he supposed to be gold, and forwarded a sample of it to Sydney. The result proved the correctness of his opinion, and thenceforth he devoted the whole of his available time to the accumulation of the precious metal. The shepherd was ordinarily a prudent man, but becoming enamoured of a young woman, he revealed to her the secret of his wealth, and produced ample proofs of its reality. From this moment ceased the monopoly which he had enjoyed undisturbed for some years; the circumstances connected with his discovery gradually became known to the public, and the local excitement was intense. The quartz-ridge and its neighbourhood were visited by hundreds eager in the pursuit, all of whom were enabled to bear away an auriferous fragment. Dr Curtis communicated the facts to Sir George Gipps, but failed to direct official notice to the locality, and ultimately Macgregor left the district (to which he is yet an occasional visitor) in search of other gold-fields. The excitement of the good people of Wellington is at present little less than it was in Macgregor's time, from the fact of these identical lands being now in the market. They consider, and with probability, that an opportunity will now be afforded for testing the auriferous capabilities of the immediate vicinity of the township. Three sections of 640 acres each are to be submitted for sale on the 29th of April instant, at Wellington, and the result is looked forward to with impatience. Copper and other ores have been also found here, in addition to which the lands are of the highest character, probably the best in the county for agricultural purposes, being watered by Mitchell's Creek.

This announcement surprised me, for it had been generally understood that these auriferous Crown lands were not to be sold by the Government at any price; and the lands now advertised for sale were not only upon a proclaimed gold-field, but they included the water privilege, the approaches, and the building site which I had applied for as requisite for the working of the gold veinstone granted to me. I wrote at once for information of the result to a friend in Wellington (Mr Lambert), and learnt from him of its sale to a Mr Matthews. In reply to other inquiry, my friend sent me the subjoined letter with enclosure; previously I had referred to the Government 'Gazette' to find a description of the land offered for sale, which appeared as follows in the Government 'Gazette,' 26th March, 1856, amongst the public land sales:

1. County of LINCOLN, 640a. (Six hundred and forty acres), parish unnamed, on Mitchell's Creek; commencing on Mitchell's Creek at the north-east corner of a measured portion of 640 acres, and bounded on the west by a line bearing south 96 chains 67 links, dividing it in part from that measured portion; on the south by a line bearing east 80 chains; on the east by a line bearing north 72 chains to Mitchell's Creek, dividing it in part from part of R. and S. Davison's quartz claim; and on the north by that creek downwards to the north-east corner of the measured portion of 640 acres aforesaid. Upset price 1*l.* per acre.

2. LINCOLN, 640a. (Six hundred and forty acres), parish unnamed, Mitchell's Creek; commencing on Mitchell's Creek, at the north-west corner of a measured portion of 640 acres, and bounded on the east by a line bearing south 73 chains 50 links, dividing it from part of that measured portion; on the south by a line bearing west 80 chains; on the west by a line bearing north 111 chains to Mitchell's Creek; and on the north by that creek upwards to the north-west corner of the measured portion of 640 acres aforesaid. Upset price 1*l.* per acre.

Mr Lambert's reply to my inquiry was as follows:

Wellington, May 13th, 1856.

SIR,—I have enclosed the information applied for through yours of the 3rd inst. I am not aware that Mr Matthews purchased with any idea of working the quartz, but think it very likely; he has been very close about it, and I understand he is getting a steam-engine up, ostensibly for a saw mill. I believe he is now in Sydney; you can hear of him at the Metropolitan Hotel, Pitt street.

Mr S. Davison. I remain, &c., H. LAMBERT.

Extract of Description from the Tracing:

"Gold has been found here, both in the bed of the Creek and in the ridges; there are also indications of the presence of copper ore."

(Signed) W. R. DAVIDSON, Surveyor.

Of the three sections of 640 acres each, submitted for sale on the 29th of April, Mr J. Matthews purchased two, viz., Lots 1 and 2. Through these two sections the quartz-vein runs through their whole extent. Lot 3 (which the quartz-ridge does not touch) was unsold.

The extract from the tracing exhibited officially at the Government land sale in Wellington, with the note beneath, stating that the quartz-vein ran through the whole extent of the two sections, was conveyed to me as above in the same writing, which I believed to be that of the Government local agent. On receiving this information I forwarded to the Colonial Secretary a strong protest against the proceeding as being calculated to subject me to much inconvenience and loss, and that too after my high claim to the placer-deposit gold discovery had been so entirely overlooked. In this protest I surrendered the veinstone provisionally into the hands of the Government, reserving a claim for adequate compensation in lieu thereof, in the event of its being in consequence eventually taken from me.

While labouring under a deep sense of the gross injustice which had been done to me by selling these country lots for agricultural purposes at an obscure land sale in a remote township in the interior, and indeed by selling this auriferous land at all, under the circumstances, I drew up a formal petition to his Excellency Governor-General Sir William Denison on the subject of my claims, setting forth the petitioner's extensive travel in the interior of the colony, and over the gold districts before going to California; his particular knowledge of the gold findings of Macgregor, and of the method used by that person to collect the metal by breaking up the "white flint" in the way described to him by the shepherd Thomas Appleby; —the petitioner's subsequent Californian experience and repetition of these facts to Mr Hargraves;—the necessity occurring of the return of his associate to join his family in New South Wales;—the petitioner's injunctions to him to search in Australia for gold;—his writing for him a letter to that purpose; —the news of Mr Hargraves having actually obtained the first placer-deposit gold reaching the petitioner in California; his inability to return to the colony, as previously stipulated, in consequence of the great fire in San Francisco;—the petitioner's going thence to the gold mines at Mokelumne Hill, and there acquiring great additional experience in gold deposits, both in quartz-veins and in "leads" beneath the hills;— his return to Sydney, proceeding thence to Bendigo, in Victoria, and meeting there at length with Mr Hargraves;—the arrangement to accompany him, then Crown Commissioner for Exploration over the Western Districts, in order to give him an opinion of their probable productiveness, accomplished entirely at his own charges, and under renewed promises of advancement;—the petitioner's subsequent visit to the scene of Macgregor's gold findings, and consequent application for the auriferous quartz-vein near Wellington;—the complaint of the grant being subsequently rendered valueless to him by the alienation of the approaches to it;—the petitioner's conviction that placer-deposits of gold similar to those which had laid so long concealed in Australia, yet existed in other of her Majesty's possessions in North Australia, North America, South Africa, India, and New Zealand, and which a practical experience was best calculated to discover;—and finally, the petition concluded with the prayer that these his services in the gold discovery, which had resulted so advantageously to the colony, might be acknowledged by some measure of that public honour, trust, and emolument which had been the first inspiring motive of action, and also by an absolute grant to him of a lease, exempt from onerous conditions, of the auriferous quartz-veins which had already been provisionally conceded to him.

Shortly after the presentation of the petition, several of the principal grievances complained of in it, namely, those arising from the alienation to Mr Matthews of the approaches to the greater development of the auriferous veinstone contained in the leasehold grant promised to me during the administration of Governor-General Sir Charles Fitzroy, together with any adverse interest in that portion of the veinstone which continues into Mr Matthews's freehold, were fortunately extinguished by my purchasing from Mr Matthews the two sections of land (1,280 acres) before mentioned, with the buildings and steam-mill subsequently erected by him thereupon. The following correspondence passed with the Local Government on the subject of the petition shortly before my leaving the colony.

Letter from the UNDER-SECRETARY OF LANDS AND PUBLIC WORKS.

Department of Land and Public Works,
Sydney, 7th May, 1858.

SIR,—In reference to your Petition to his Excellency the Governor-General, praying for compensation for alleged services in connexion with the discovery of Gold in New South Wales, I am directed to inform you that, without questioning the accuracy of the statements therein contained, the Secretary for Lands and Public Works fears that no action can be taken upon it by the Government.

2. I am further to state that, according to the reports in the public prints, you appear to have joined in the demonstration in honour of Mr Hargraves's discovery, and thus admitted the justice of his claim to the reward.—I have, &c., MICHAEL FITZPATRICK, Under-Secretary.

Simpson Davison, Esq., 1 Upper William street, Wooloomooloo.

REPLY.

Sydney, 1st June, 1858.

SIR,—I do myself the honour to acknowledge receipt of a communication from your Department, by which I am informed, with reference to my petition to his Excellency the Governor-General, that, without questioning the accuracy of the statements therein contained, the Secretary for Lands and Public Works in New South Wales fears that no action can be taken upon it by the Government, and that, according to the reports in the public prints, I appear to have joined in the demonstration in honour of Mr Hargraves's discovery, and thus admitted the justice of his claim to the reward.

In reply, I trust that it may not be out of place to observe that as far as relates to Mr Hargraves the petition in question contains no complaint against the justice of reward to him. I admit with satisfaction that I have upon several occasions expressed my opinion that some reward was due to his exertions. I have also at a public banquet and elsewhere joined in the demonstration in honour of the discovery made by him at Ophir in 1851, and have not now the slightest wish to recall aught which I may have said to his advantage upon those festive occasions; but after these admissions, I cannot allow that by so doing I have in any way invalidated my own claims to consideration, nor have I ever in the public prints expressed any opinion either in approval or in disapprobation of the amount of pecuniary reward granted to him by the late Legislative Council.

I venture, however, to take this occasion to express extreme surprise and dissatisfaction that the Local Government which formerly omitted to submit my testimony before the Gold Committee of the Legislative Council in 1853, should at any time have noticed, apparently in my disfavour, any vague reports in the public prints where greater license prevails, and in which not unfrequently assertions are made that might not be done with equal propriety before graver tribunals invested with lawful authority.

I beg now to state that I have appointed Mr John Willis Davison, of Sydney, by power of attorney, to act for me during an intended absence in England, and to request that should any other application be brought before the Government for permission to extract gold from any part of the veinstone described in the aforesaid petition, that information of the application may be conveyed to him.

I have, &c., SIMPSON DAVISON.

The Honourable the Secretary for Lands and Public Works.

The discoveries of gold and the consequent rush of gold-diggers both to Port Curtis, North Australia (see APPENDIX D), and to the Frazer River, British Columbia (see APPENDIX A), shortly followed the date of the preceding petition, in which both places are enumerated as being probably highly auriferous. The former discovery led at first to much distress and disappointment, owing in great measure to the want of adequate exploration in advance of emigration, the *locale* of the placer-deposits in North Australia not having been determined in anticipation of the wants of those eager crowds who hurried thither in 1858. The Burdekin River, and other parts of the territory further north than Port Curtis, had been spoken of immediately after the placer-deposit discovery in New South Wales, as being likely for profitable gold-fields, according to the geological description given by Dr Leichardt, to which I had referred again immediately after returning to New South Wales, although in possession of the main facts of his statements during all the period of my residence in California; for the explorer's original description had been from the first fixed in my memory because of my being a squatter on the extreme northern frontiers at the time of the first publication of these explorations, and feeling therefore deeply interested in them.

The diggings in British Columbia have, however, already proved to be a great success; and, even on the opposite side of the great dividing meridional range of the Rocky Mountains, namely, on the eastern watershed in the State of Kansas, very satisfactory gold-mines in placer-deposits have also since been discovered, and continue to be successfully worked. In Canada a small quantity of gold has been found on the Chaudière River; but the vast tract of British territory on the north-west of America, which is almost entirely of the formation and under the physical conditions most favourable to the existence of profitable gold-fields, that is to say, of the igneous, metamorphic, and primary fossiliferous formation on the flanks of a great dividing meridionally-directed mountain chain, continues yet comparatively unexplored.

The history of the Wellington veinstone may be briefly re-capitulated in a few words. I first heard, in New South Wales, about the year 1848, of the gold collections in this vicinity having been obtained from quartz, through my own shepherd Thomas Appleby, who very distinctly informed me that the shepherd near Wellington "got his gold by breaking it with a hammer out of white flint." The confirmation of the shepherd's gold specimens having been broken from quartz was made and reported to the Government by Mr Hargraves immediately after his return from California, and he has since related the circumstances in his book, where, at page 118, he says, "I then proceeded to Mitchell's Creek under the guidance of a native black fellow whom Mr Cruikshank provided for me, It was not difficult to find where the old shepherd procured his gold, though he had not touched the alluvial soil." The Count Strzelecki, as far back as 1839, is said to have found indications of *veins of gold and silver near Wellington*, as well as an ore of auriferous pyrites somewhere in the colony (see Q. 18 of the Rev. Mr Clark's evidence in Appendix H) and the veinstone near Wellington is certainly throughout impregnated with auriferous pyrites and iron oxides, in addition to its containing visible gold in white quartz. The Surveyor-General, Sir T. Mitchell, and the Government Geologist, Mr Stutchbury, have since then severally examined and reported officially on the mineral promise of the district, and both have in a vague and general way expressed their anticipations of important commercial results whenever the auriferous lodes or veinstones of the neighbourhood shall be subjected to systematic mining operations.

CONCLUSION.

IN the foregoing pages I have faithfully narrated and brought before the public the various circumstances and personal precedents which gradually led to the first discovery and to the subsequent great developments in Australia of gold in the condition of placer-deposits, the nature of which, in their mode of occurrence in the earth, as distinguished from that of metallic gold in quartz-matrix veinstones, I have endeavoured to render as intelligible to the general reader as the difficulty of the subject will admit. These personalities are not entered upon with the intention of damaging the reputation of others who may have contributed their quota in the Australian gold discoveries, but simply to set forth my own just claims. The impartial reader will readily grant that, not alone the hand which executes, but also the intelligence which guides in every successful enterprise, has an indisputable claim to participate in the resulting honours and benefits, after the proposed end has been accomplished; and although I can neither boast the advantage of possessing superior intellectual gifts, nor higher scientific acquirements than other several claimants to inductive as well as to actual gold-discovery, yet I do contend that the great advantages of comparison and experience derived from long travel and very extensive observation had placed me in a position much more favourable to judge of the auriferous character of the interior of Australia than had been attained by any other individual, either scientific or practical, who has since brought forward the remotest claim in connection with the gold-discoveries. With equal truth I can affirm that those conclusions which conduced so much to the particular discovery were based upon empirical knowledge, acquired by personal examinations and comparisons in the field, and were not like the suggestions of several popular authorities, merely the conjectures of scientific speculation, framed upon fanciful and often entirely false data.

The reasons which primarily led to the conclusion that gold existed in Australia, spread upon the rocky floors in placer-deposits—a conclusion logically founded upon negative and positive facts, which were not previously possessed by the scientific world, have already been stated in my several public letters, before a gold-mining community, at a time when the actual conditions of gold-deposits had become tolerably well known to it—a community amongst whom the purely imaginary speculations of inexperienced naturalists had already excited feelings of regret and dissatisfaction in reflecting that so much ability, mental power, and scientific information should have been so repeatedly exerted on the question by those who were nevertheless destitute of that indispensable previous acquaintance with the true facts in nature, and while possessed of a delusive and prejudicial belief in alleged facts· which in reality were either altogether false or very much perverted. My earliest proclamation in Australia of the fundamental facts upon which the reasons were based which led me, in California, after extensive comparison of the broad geological features, to infer the existence of placer-deposits in Australia, has resulted in a very satisfactory admission both of their truth and of their novelty, from authorities well qualified to pronounce a just decision in the matter—First by the anonymous writer whom I am constrained to believe to be *the highly scientific authority* whom I had intentionally invoked and regarded, in that stage of his experience, as the most competent judge on the question; and although this scientific authority has hesitated to publish before the public his scientific sanction with his avowed name to the guarded admissions, he has nevertheless subsequently assured me of them in private colloquy, unless I am altogether mistaken in the identity of the persons. Secondly, in the very energetic, open, and impartial corroboration of the leading facts in nature which I had stated, and of the correctness of the important conclusions which I had drawn from them, by William Howitt—an author whose independence of thought is above suspicion, and whose gold-mining experience entitles his opinion to greater weight than that of any aurageologist who has ever endeavoured to frame opinions without first possessing himself of the requisite premises. And lastly, by Mr Hargraves in his unqualified acceptance of my conclusions in his book. That a theory of some sort is necessary for observation and description is my only apology for having attempted to integrate into one complete theory the whole of the empirical facts connected with gold, as well in placer-deposits as in quartz-veins, while the task both of collecting facts and of integrating them has been rendered the more difficult in consequence of the necessity of having had first to demolish the false hypotheses which practically inexperienced men of science had too readily countenanced, and which had therefore, in a very vague way, acquired so considerable a popularity.

The discovery of gold in quartz-matrix by the shepherd Macgregor, near Wellington, is the one of greatest importance of any accidental discovery, because of the frequent repetition of his gold collections extending over a number of years. These were all made upon one quartz-vein, while in every other instance of gold-finding each has been but a single and solitary case. By inquiring on the spot, I have learnt that Macgregor had collected altogether gold of the value of about two hundred pounds sterling previously to the discovery of gold in placer-deposits. This sum may appear to be small, but considering that it was entirely obtained by breaking the surface quartz with a hammer while following the occupation of sheep-tending, I should think that it not improbably represents *a thousand separate instances of gold-finding* between the year 1840 and 1850. Though Macgregor's accidental discovery of gold in quartz-matrix is long prior in date to the more recent discovery of the metal in placer-deposits in Australia, and although the former be in no way originally due to my suggestions, yet that very same discovery of gold in the matrix in New South Wales, notwithstanding the ineffectual endeavour to keep the matter secret, early became, during my subsequent examinations of the placer-deposits of gold in California, an important element in considering the probable existence of gold in like placer-deposits in Australia. The gold-findings of this shepherd, I have every reason to believe, were brought under consideration of the Local Government of New South Wales more immediately through my representations than by the spontaneous act of any other individual—it is even yet in some degree a question with myself which of the two—whether the information which I had obtained and communicated to my associates in California concerning this shepherd's repeated collections in the colony of matrix gold, or whether the abstract inquiries, extensive comparisons, and practical knowledge which previously to Mr Hargraves's return from California I had made and acquired during the several years of travel and mining experience in Australia and California—the particulars of which are already narrated in the INTRODUCTORY NARRATIVE—most contributed to determine the existence in the Australian colonies of those valuable placer-deposits of gold which, through the instrumentality of Mr Hargraves, were first made known to the Government and to the public in the year 1851—the successful issue of whose mission has caused the event to be since so universally termed "The Gold Discovery." My experience, observation, subsequent reading—and it may be my parental partialities—have led me to believe this discovery to be an intellectual conquest over the secrets of nature rather than the consequence of information concerning the accidental gold-findings in matrix by an unlettered shepherd. Still it is for others rather than for myself to judge of this question; but to whichever circumstance "The Australian Gold Discovery" may be the more justly due—whether it be the fruit of an intellectual conquest based upon experience, or whether merely the consequence of the shepherd's gold-findings in a quartz-veinstone, it is certain that the placer deposits in Australia do not owe their revelation to those false teachings of so-called science, such as existed with reference to the geognosy of gold before the placer-deposits in California had come beneath the observation of practical gold-diggers from the Australian colonies.

In addition to the frequently-repeated findings of gold in the same veinstone near the township of Wellington, in the western districts of New South Wales—all made by the same individual, the shepherd Macgregor — there had already occurred several other independent instances of gold-finding in the colony before the year of the general development of gold in 1851. In almost every one of these instances the specimens had been found in quartz matrix ; it is a very doubtful question whether or no any exceptional one of them had ever been collected from those gold repositories, which are now better understood by the terms of alluvial washings or placer-deposits, to distinguish the metal so obtained from that which is found enclosed in a stony matrix. These casual specimens had been mostly found by persons totally ignorant of the geognosy of gold deposits; and whenever a chance specimen had been referred for judgment to men well informed in general knowledge, the referees without exception being like the applicants, totally destitute of practical experience, or at most prepossessed only of incorrect geological hypotheses, were especially ignorant of the radical difference which exists in nature between those prolific beds of gold horizontally spread—that is to say, the placer-deposits—such as have of late years astounded the world with their marvellous productiveness and those other nearly vertical sources of this metal—namely, the veinstones of gold-bearing quartz, which, it may be fairly said, have during the same time equally disappointed the world with the paucity of the treasures they have yielded. In every case, when one of the solitary specimens to which I have just alluded had been formerly brought to light, the sample was prized by the finders, by their friends, and by each scientific referee, simply as an evidence of the imaginary value of the auriferous veinstone from which it had been procured, or whence it was supposed to have been detached. The neighbouring quartz-veins in those cases (Macgregor's alone excepted) never yielded any further gold-specimens to the geological hammer, and hence the continually recurring disappointments. The ignorant assumptions of the value of these quartz-veins therefore invariably proved to be illusory, because based upon pseudo-scientific teachings. The placer-deposits had in fact never before 1851 been sought for. Never did the most sanguine anticipator foresee until after a Californian experience had taught the practical gold-miners the monstrosity of those prejudices, miscalled scientific deductions, that these early findings of gold in quartz were chiefly of value as indicative of horizontally deposited gold-beds, and that, generally speaking, not in the veinstones, but in the placer-deposits themselves lay the greater and the more easily accessible metallic wealth.

The reported accidental findings of gold extend over a number of years—indeed, almost from the first foundation of the colony. Mr Howitt and Mr Hargraves, both of whom have had excellent opportunities of making inquiry, have each enumerated the several rumoured gold-findings which had transpired previously to the year 1851, yet neither of them have taken much pains to distinguish the fabulous accounts from the true ones. The account of the finding of gold by a convict previous to the year 1800, for instance, is, upon *primâ facie* evidence, untrue and improbable. This man is said to have found a piece of gold on the shores of Port Jackson, but failing to satisfy his superiors by repeating his performance, to have been whipped as an impostor. Mr Howitt thinks this an extraordinary account, and that the man may in truth have found gold. It is, however, both geographically and geologically impossible that he could have done so, no gold having yet been found, nor any being likely to be discovered in the part of the colony then in occupation of the white people. There is no gold in natural deposit on the shores of Port Jackson. The convict was undoubtedly an impostor, and deserved punishment for the imposition.

It is also sometimes said, that in making the Western Road to Bathurst, over the Blue Mountains, in the early days of the colony, the convict labourers employed under Surveyor-General the late Sir Thomas Mitchell picked up several small pieces of gold, and received stripes for their pains. This account is probably unfounded, though it is just within possibility, since the last few miles of the road were made through a country which, in a general way, may be considered slightly auriferous, although no gold of any moment has hitherto been found near the road. Sir Thomas Mitchell, however, was not the sort of man to hush up a discovery of any kind. The interior of the colony, in its length and breadth, had been explored by him at the public charge, and his silence and acquiescence sufficiently show that he remained virtually ignorant of its auriferous character.

The tracks of his early exploring expedition remained, at the time of my being in Victoria, still visible near Mount Alexander and Bendigo, when these amazingly rich gold-deposits had been opened by the gold-diggers ; yet Sir Thomas Mitchell never so much as suspected the auriferous character of the country, which he named Australia Felix, and which now constitutes the colony of Victoria. Anonymous writers, in an indirect way, frequently intimate that Sir Thomas Mitchell predicted and discovered the presence of gold ; but I believe there is no foundation whatever for the rumour, nor did Sir Thomas Mitchell himself ever countenance the insinuation of such false reports. Another amateur surveyor of highly scientific character, who visited New South Wales *on purpose to examine its mineral and physical character*, and to whom newspaper paragraphs, and other anonymous authorities, sometimes award the merit of having discovered gold in the colony, is the Count Strzelecki. Mr Howitt, in his account, dwells upon the circumstance that Mr Macarthur in the Legislative Council stated that Count Strzelecki had, during his residence in the colony, shown to him a piece of quartz he had found, in which *several specks of gold were visible*. In the first " Physical Description " of the colony which Count Strzelecki published no mention is made of any discovery of the precious metal, and in the second publication there is one single line, to the effect that the rocks probably contain gold ; but the observation referred to auriferous pyrites, and not to metallic gold, such as the gold-washers and the auriferous quartz-miners now obtain. The visible specks which Mr Macarthur alludes to are now ascertained to have been visible *auriferous pyrites* only. Count Strzelecki himself lays no claim to the gold discovery in the sense in which it is usually understood ; but upon the general principle that all iron pyrites contains a tracing of gold, and, indeed, that all rocks whatever contain infinitesimal and invisible atoms of the precious metal, one may have no difficulty in admitting Count Strzelecki to be *a sort of a gold discoverer*. But, considering that visible metallic gold, either in quartz matrix or from alluvial washings, was neither discovered nor anticipated by this scientific explorer, who proceeded *purposely to examine* the mineral and physical conditions of the country which abounds in the precious metal, the reader will probably agree with me in thinking, that the less said the better concerning the gold discoveries of Count Strzelecki.

But while Count Strzelecki, in published correspondence addressed to Sir R. Murchison, disclaims having informed him (as some of the said anonymous writers have affirmatively rumoured) to the effect that Australia appeared to be a gold-producing country, Sir R. Murchison himself is said to have inferred the auriferous character of the Australian Cordillera from the specimens of rock which the Count presented to him. Now, leaving out of the question altogether the mistaken notions of this authority, about the equable dissemination of gold in granites, schists, and limestones, and any consequent inferences he may have drawn from specimens of these rocks, and confining the inquiry only to quartz-rock, which is allowed to be in truth a matrix of visible gold, let me ask, can Sir Roderick Murchison, or any one else, distinguish the quartz brought from a non-auriferous country from the non-auriferous quartz brought direct from the richest gold diggings? I think no one can distinguish between the two. Quartz is, no doubt, often a good indication of gold ; but then quartz is throughout nature an abundant rock. It exists also in profusion where gold is not. With respect to the equally wide margin of prediction, founded on the direction of the Australian Cordillera in its length of nearly two thousand miles, the extent of mountain range is so great, that the observation founded on Humboldt's theory can be considered only as the vaguest of vague generalities; and after all ought, perhaps, only to be ranked as one of those physical coincidences which the historian Southey describes as "fantastic correspondences," such as formerly led the gold-miners in Brazil to consider "the direction, the form, the magnitude of the hill, or mountain, and the herbs which it produces," as indicative of gold,—considerations which, the historian facetiously relates, were then looked upon as "a sort of madness."

There remains a country yet unexplored for gold where the Cordillera is meridional—where a slope towards the interior exists on one side, and where the sea washes the bluffs and precipitous headlands of the Cordillera on the other. Can the science of Sir Roderick Murchison now predict on which side of the dividing range the auriferous deposits ought to have been produced? The country referred to is Patagonia. This may be said to be no man's land. If any of the small South American Republics do possess a paper title to it, a few dollars would at the present time purchase their interest. If placer-deposits of gold of the value of millions of pounds sterling, as in Australia, are contained on the eastern slopes of the Cordillera of Patagonia, there is a fair field upon which Sir Roderick Murchison may apply his scientific principles and predict its golden wealth, and he is now in a position to move the Imperial Government to possess itself of the territory in anticipation of practical discovery, and preparatory to sending thither the Cornish tin-washers. Slate and quartz rocks are abundantly developed in the Straits of Magellan, as I noticed lately on reading an account in "The Voyage of H.M.S. Beagle." The description is highly favourable to its auriferous character. In Australia gold is most developed on western watersheds; in the Ural it is on the eastern slopes; in California the gold deposits are on the west of the Sierra Nevada; in Brazil they are on the eastern slope of the dividing meridional range;—on which side of the Cordillera, then, does the particular science of Sir Roderick Murchison indicate that nature should have deposited gold in Patagonia? The Cordillera in question is the prolongation of a dividing range already ascertained to be auriferous; the whole country is not now better known than California was before the late gold discoveries; and it is, I think, quite probable that placer-deposits of great value may be there buried beneath the alluvia.

When Count Strzelecki exhibited the quartz rock from Australia, and Sir Roderick Murchison suggested that "quartz is an indication of gold,"—did it need any "man of science" to make that trite affirmation? Admitting the fact of so common-place an observation having been made, is this every-day expression to be called the scientific gold discovery by induction? Truly I need not fear to urge my own practical induction against the scientific prediction of one whose claim upon public consideration rests upon so vague a foundation, even if Mr Hargraves had not actually made *the gold discovery* with my letter in his pocket and my persuasions fresh in his mind when, in 1851, while on the road to Wellington, placer-deposit gold was first washed out by him from a slaty bed-rock in Australia.

My friend Mr Rudder had in California always expressed his utmost confidence in the scientific fallacies of the time, especially of the doctrine of the equable dissemination of gold in granite; nevertheless he had entirely failed in proving it to me by actual experiment, and even after our return to the colony he somewhat detracts, in private communications to me, from the merit of the discovery made by Mr Hargraves owing to his being himself still prepossessed with these false prejudices. Mr Rudder, it is to be observed, had had no communication with us in California for several months previously to Mr Hargraves's departure, and therefore knew nothing whatever of our views with respect to searching for placer-deposit gold in Australia. On the 2nd of May, 1853, then in the colony, Mr Rudder writes to me of Mr Hargraves, whom he knew had succeeded only in procuring a very few specks of gold in Australia, that he (Mr Hargraves) was "the fortunate developer of that which others had found but knew not how to procure from *the deposits derived from the matrix.* These several individuals (meaning Clarke, Macgregor, Smith, &c.), discovered," says Mr Rudder, "*the source* from which Mr Hargraves *developed the detached and disintegrated portions.* They were the true discoverers of gold." And Mr Rudder concludes by telling me that, in his opinion, it would have been more beneficial to Mr Hargraves had he done more honour to so highly scientific a man as Sir Roderick Murchison! This is a very fair specimen of the pseudo-scientific notions which once prevailed, and since it is now found that *the quartz-veins are destitute of gold* in the locality in question, the *source* of which Mr Hargraves is said to have developed the detached portions, *yet remains to be discovered.* In the several localities especially connected with the placer-deposit gold discovery, the same prejudices have proved to be remarkably infelicitous and equally fallacious. In the first place observe—I sought for matrix gold at Goodgood, and found none, because the quartz-veins there are not visibly gold-bearing, while alluvial gold is, nevertheless, spread upon the slates. Secondly, Mr Lister sought for matrix gold on Summer Hill Creek, but found no visible gold within the quartz-veins, while in the same watercourse alluvial gold free from matrix was eventually discovered reposing upon the slate bed-rock in abundance. Thirdly, Mr Hargraves found no gold in the quartz-veins in the same locality. Fourthly, Sir Thomas Mitchell failed to find gold-bearing quartz-veins in that neighbourhood, after careful exploration of the district at the public charge, and he then reported (see Appendix D) "that to find gold in the quartz is a most uncommon circumstance." I believe he discovered none whatever; and lastly, the Colonial Gold Mining Company, after employing a great deal of labour upon one large quartz-vein on this same Summer Hill Creek, failed entirely to find any gold in it. Then look at the reverse of this picture—matrix gold was found abundantly in a veinstone near Wellington by the shepherd Macgregor, and again in matrix before 1851 at Canowindra by Mr Icely, and again in matrix before 1851 by the Rev. Mr Clarke at Winburndale Creek, while no placer-deposits of any note have ever since been discovered near any of these gold-bearing quartz-veins, and yet placer-deposit gold at every notably rich gold-digging is so obviously of local origin that any gold-digger can at once perceive by the accompanying physical conditions when he is upon a placer-deposit gold-field, while the metallic grains beneath and in alluvia are generally quite free from stony matrix of any kind—moulded upon the floor—often unabraded, and have evidently been produced near the spot by some natural means, and not brought thither from a distance.

With respect to the specimen of gold exhibited to the Government by Mr Smith about the year 1846, already noticed in this volume, some misconception exists in the public mind with reference to this instance of gold-finding. I have somewhere seen it stated that Mr Smith had the same terms offered to him which were subsequently made to Mr Hargraves—namely, that if he would reveal to the Government the locality where the gold mine was situate, and leave the question of recompense to its generosity, his representations should be attended to, and that he unwisely declined this proposal. The Colonial Secretary himself stated something to this effect at the banquet in Sydney on the second anniversary of the gold discovery. The following Minute of Council relates, I believe, to this person :—

MINUTE of HIS EXCELLENCY SIR CHARLES A. FITZROY, GOVERNOR IN COUNCIL, respecting Mr HARGRAVES's first application for reward. (See page 86, letter No. 2.)

Let a similar answer be given to this as was returned to a former proposal from another person who professed to have discovered gold on Crown Lands, to the effect that, if he thought proper to make known the locality where it was to be found, he might rely upon the liberality of the Government in rewarding him in due proportion to the value of the discovery when ascertained.

5th April, 1851. (Signed) C. A. F.

The truth is, that Mr Smith, having only purchased the specimen, did not, of his own knowledge, possess the information required of him. The specimen in question had, in fact, been found amongst the grass, by a shepherd, at no great distance from the place where Mr Hargraves washed out the first gold in 1851. It was then supposed by most persons to be stolen jewellery melted down and lost again. This shepherd sold the specimen to a Mr Trappit, who again sold it to Mr Smith, but none of them possessing the slightest knowledge of the nature of gold-deposits, nor of the art of gold-washing, Mr Smith could not impart to the Government information which he did not himself possess. Mr Smith was at this time engaged in organising an iron mining company to work the Fitzroy Iron Mine at Mittagong, in the southern district of the colony, and as I have been told, he displayed the specimen of gold on a table in his office, and by mysterious observations and an air of secrecy, led the applicants for shares in the iron mine to infer that the gold also had been dug out of it. As a matter of fact, the piece of gold exhibited by Mr Smith was, no doubt, the produce of the colony, but Mr Smith had no share or merit in the discovery or accidental finding of the gold specimen of which he had only become the third possessor.

A letter lately appeared in the local papers alleging that a Government surveyor had once reported, in one of his official communications, the finding of gold on the Fish River, nearly in the same locality where a servant of Mr Low's had, in 1830, found a specimen of gold several ounces in weight. A shepherd on the Pyrenees, besides, was alleged to have found gold about the time of our going to California—a subject which, as I have stated in the Introductory Narrative, occupied the public prints while the barque Elizabeth Archer remained weatherbound in Sydney Harbour in 1849. The previous solitary instance of gold-finding by the Rev. Mr Clarke has already been noticed, and, in further explanation, it is to be observed that this scientific geologist had not travelled extensively over the auriferous districts as I had done, but had merely discovered the one accidental specimen on the boundaries of the carboniferous formation, the extent of the coal measures being then the object of his explorations. A considerable lump of gold, it appears also from the report of the Victorian Gold Committee of Inquiry (see page 118), was found in 1846 in that part of Australia which then was an integral part of New South Wales, and only subsequently became erected into a separate colony during the time when Mr Hargraves and I were in California.

But, except the numerous collections of gold which had been made, as already stated, by the same shepherd from one veinstone near Wellington, all the rest of these fortuitous gold-findings remained entirely unknown to me when formerly resident in the colony, until the more notorious placer-deposit gold discoveries called them from their obscurity into public notice; and for the most part I may very safely assert that they were until then just as little known to the Government and to the Australian public. The reader may judge upon the evidence before him whether the local Government had accepted as important facts, or passed over as idle tales, the few authenticated instances of gold-finding which had been reported to it previously to the year 1851.

The only casual stumbling upon the precious metal of any great importance, next to the shepherd Macgregor's, is the one just mentioned as made by the professional geologist, the Rev. W. B. Clarke, who, as it afterwards publicly transpired, when in pursuit of another object, came across a specimen of gold in a quartz-vein on Winburndale Creek, a tributary of the Turon River, and not far from Bathurst in New South Wales. This occurred as far back as the year 1841, and after strict investigation, it now appears that he then apprised of the fact his Excellency Governor Sir George Gipps and other official personages in the colony, and at the same time expressed an opinion, or hope, or wish, that the metal might ultimately be found in available quantity in Australia. That these loose, yet nevertheless fortunate, prognostications were founded upon very erroneous ideas is now apparent enough; yet I am far from intending to imply aught in derogation of the great abilities of this distinguished votary of science: I speak only of early and unripe opinions which were unquestionably formed in part on the misteachings and false inductions of other naturalists, ill-informed and inexperienced on the subject of gold-deposits. The errors into which such pseudo-instructions may once have led so philosophical an inquirer have been, no doubt, thoroughly rectified before this time in his own mind by many subsequent examinations of gold phenomena on the field of nature. The Rev. W. B. Clarke may still perhaps be justly entitled to be called "The first discoverer of gold in Australia," especially by those persons who have not yet realized to their own satisfaction the fact which I allege, namely, that the demonstration of the existence of gold in Australia in the condition of placer-deposits is an independent and more important discovery, and quite distinct from that of the matrix gold discovery. It is just possible that there may still be found persons who, from prejudice, interest, or ignorance, fail to recognise in this event any new discovery, novel application of principles, or logical conclusions derived from empirical knowledge and actual observation, and who, therefore, refuse to admit that the placer-deposits discovery is owing to any combination of these with the advantages of having previously made an extensive comparison between the two ocean-divided and most productive auriferous countries ever yet explored by either the practical gold miner or the scientific philosopher.

A few years before the placer-deposit gold discovery there existed for a time in New South Wales a mania for copper mining enterprise. Veins of copper ore of valuable character were found in the Western District of New South Wales, and amongst these were some upon the lands of Mr Icely, of Coombing. In seeking for copper Mr Icely obtained some specimens of gold in quartz matrix from a veinstone near Canowindra. Mr Icely also showed to me at Coombing a letter, dated in 1847, from his sheep overseer at some out-stations, in which the overseer, alluding to a late search for copper, says: "John —— has not been able to find any copper ore on the sheep run like the specimen you sent him, but only a small streak of yellow copper." The yellow copper is now presumed to have been gold, but this singular case is quite distinct from the one in which gold had been actually found in the veinstone on Mr Icely's land at Canowindra.

The evidence in Appendix K will show the reader that Mr Hargraves became informed of this instance of gold-finding by Mr Icely as soon as he landed in Sydney from California, and that he then proceeded to search for gold in the western district, having my letter in one pocket and Mr Icely's specimen in the other, and being also at the time thoroughly informed through me both of the mineralogical aspect of the interior generally and of the popular rumours of Macgregor's gold-findings near Wellington (the latter having very probably been corroborated to him in Sydney by other informants, although only stated in the evidence to have been fully confirmed on the road thither by an innkeeper at the Vale of Clwydd), and considering that Mr Lister had been already seeking for gold in the quartz-veins, and that by guiding Mr Hargraves down Summer Hill Creek he diverted him from the original intention of going first to seek gold either near the auriferous vein of Mr Icely or near the gold-bearing veinstone at Wellington, it is evidently untrue to term Mr Hargraves literally "The first Discoverer of Gold in Australia." And except that Mr Hargraves is the demonstrator of the conclusions which I have explained, and that my comparisons of the western watershed of the Cordillera had led me to infer the auriferous character of the whole, it would be absurd to call him a gold discoverer at all, except in that limited sense in which every gold-digger may be said to be the discoverer of the gold which he actually removes from the earth with his own hands.

Some of the first proceedings of Mr Hargraves on arrival in Sydney have not before been clearly explained either in the Legislative evidence or in a more popular way. Mr Hargraves on leaving California was not deficient in pecuniary means for travelling in New South Wales to examine the localities agreed upon, and he therefore required no assistance from me in money. The gold-dust which he brought across the Pacific had chiefly been received by him in wages for working on the Natchez claim on the Yuba, but during his absence in California his domestic affairs had unexpectedly gone wrong in New South Wales, and the debts contracted by his family consequently absorbed his little capital. His business during many past years had been that of a country storekeeper at Brisbane Water. To proceed, then, to search for gold he applied to a Mr William Northwood, in Sydney (since then more publicly known as Mr Alderman Northwood), for the sum of one hundred pounds to pay the expenses of travel. Mr Northwood supplied this amount upon condition of receiving the moiety of any reward which Mr Hargraves might obtain, and of receiving early information so that he (Mr Northwood) having money, might then buy up the auriferous land. When the Executive Government granted 500*l.* to Mr Hargraves as a first instalment of reward, one-half of the sum was handed over to Mr Northwood, and it is to this transaction that allusion is made when, in the application to the Victorian Government, the complaint is stated by Mr Hargraves of his having, when a poor man, had to borrow money at a hundred per cent. in order to prosecute his researches for gold in New South Wales. Mr Northwood has ever protested against the payment of this amount of money as being in effect a violation of faith upon a simply verbal contract. The Victorian Government, however, never inquired into the details of the "noble disinterestedness" which demanded only a reward in money ot indefinite amount, proportioned to the magnitude of the gold produce, but they presumed that the Government of New South Wales had already made every investigation when in truth no inquiry has ever been more partially conducted. That all-powerful statesman and advocate, the Colonial Secretary, had apparently resolved from the first negociation that in the name of Mr Hargraves alone a large sum of money should be obtained from the Legislature, whatever may have been the unpublished terms of that negociation as regards any subdivision of the pecuniary grants.

I should deeply regret casting any ungenerous reflections on Mr Deas Thomson, the late Colonial Secretary, were they unmerited, but I can without compunction state the plain facts of the case, when I feel the injustice done to myself,—not by this State authority having duly heard my statements, and then preferentially decided in favour of my former associate that "the gold discovery" was an indivisible unity for which my companion alone was entitled to receive all the public honours and substantial rewards—but by his having ignored and wilfully refused or neglected to hear my account at all, for no other reason that I am aware of, but that he had at the first interview with Mr Hargraves (who then had my letter in his possession, and who had just proved the discovery to which it related by having in consequence just procured the few specks of gold which were then exhibited to him) promised that he (Mr Hargraves) should be rewarded in proportion to the magnitude of the whole discovery—a promise subsequently confirmed by a Minute of the Governor in Council—and apparently without ever inquiring whether Mr Hargraves had been sent as the agent of another, or whether he had acted entirely upon his own judgment. The original promise was made by the Colonial Secretary, while knowing that literally the gold obtained by Mr Hargraves was not by any means "the first discovery of gold," without his apparently having cared to ascertain whether or no it was a discovery in any way differing in principle from the preceding ones, and while being fully aware that many scores of gold-washers were then in New South Wales, any one of whom was quite ready, for the smallest consideration, to teach the art of gold-washing to the Government geologist. Upon what principle of right and justice, then, did Mr Thomson dare to negociate so exclusively? Would Mr Thomson have proposed an unlimited money gratuity to any practical tin-washer if Sir Roderick Murchison sent one to him with a few specks of gold? Would Mr Thomson have given the same pledge to a black fellow, had I sent such a person to him from California upon an errand of this nature? I have arrogated no superiority of caste, intellect, or education over my associate—there might have been a wider difference between us in these respects—but may I not now hypothetically inquire, would Mr Thomson in any case have promised and adjudged the whole substantial benefit exclusively to a delegated demonstrator?

At the examination of Mr Hargraves before the Legislative Committee, the Colonial Secretary again outraged common sense by acting at the same time in the threefold capacity of judge, witness, and advocate. Question No. 42 of the first examination of Mr Hargraves is a preposterous one to ask an interested witness in expectation of a large money gratuity, and it is no less preposterous that Mr Thomson, who had avowedly negotiated and promised the gratuity, should propose the question. It leaves the painful impression that the witness had been crammed for the occasion, and instructed to reply in the negative. The question ought rather to have been put to me than to the person directly interested, and my reply must of necessity have been just the reverse if the inquiry had been fairly instituted, as I think it ought to have been. In addition to my own testimony, there was ample collateral evidence to be obtained that Mr Hargraves had, whilst in California, heard a great deal about the quartz-vein near Wellington. The Colonial Secretary had not even the excuse of being unacquainted with my character and precedents, for I had then been personally introduced to him by Mr Hargraves; Mr Mort had before, at the public banquet where Mr Thomson presided, spoke of me during my absence from the colony in the highest terms, and I had already had three personal interviews with the Colonial Secretary, at all of which he appeared to be only anxious to ascertain whether I could say aught further in favour of his client, and although Mr Hargraves himself had been anxious that my testimony should be taken (see Question 51, second examination), the Colonial Secretary seems to have thought that it better served his purpose, in taking measures to secure a grant of public money, to overlook altogether my individual claims to public consideration, and to oppose the admission of any explanatory statements in the Legislative Council.

Mr Thomson had, in New South Wales, filled the important office of Colonial Secretary upwards of a quarter of a century—an office which, in the colony, may be said to correspond with that of Prime Minister in the Government of the United Kingdom, except in the particular of being responsible to the Legislature—the Colonial Secretary, before the late introduction of local self-government by a responsible Ministry, being irresponsible to any political authority except the Governor-General. During the late gubernatorial administration of Sir Charles Fitzroy, Mr Thomson had the reputation of being, in fact, "*the* Government," since Sir Charles Fitzroy in reality troubled himself but little with the duties of administration, being of passive temperament, and having received the honorary appointment in consideration of military services rendered on the field of Waterloo. The power wielded by Mr Thomson was therefore very great indeed. Mr Thomson had in earlier life married the daughter of Governor Sir Richard Bourke, and the marriage had brought him the appointment of Colonial Secretary, with a small salary at first, which had gradually increased with the rising importance of the colony, until the annual stipend had reached the sum of 1,500*l.* When the gold discoveries had caused an increase in the cost of living, an augmentation of salary was proposed in the Legislature for all Government officers with fixed salaries, and a sum of money accordingly placed upon the estimates to meet the increased requirements. Out of this money an addition in salary of 500*l.* per annum was awarded to the Colonial Secretary, and in his case the grant took effect *retrospectively for six years.* Thus, as a political opponent remarked, "Mr Thomson put three thousand pounds of the public money into his own pocket at one stroke;" finally, when the retiring pensions of the officers of the old Government were embodied as a part of the new constitution, Mr Thomson, who took a most active part in framing it, had placed his own retiring pension at the full amount of salary—that is, at 2,000*l.* per annum—so that, independently of any other benefits from it, the gold discovery brought to Mr Thomson an additional life pension of 500*l.* per annum.

A more powerful patron could not have been desired than Mr Deas Thomson, who, having at his disposal all the mighty machinery, both moral and material, which it is only the prerogative of delegated sovereignty to wield, moved alike the official authorities, the press, and the public, to honour and reward his own adopted "gold discoverer." Not only did Mr Thomson employ his ostensible authority, but every *ad captandum vulgus* artifice and populace-moving agency of the Barnum type was evoked to stimulate the popular enthusiasm until an Hargraves mania raged in the colony, which can only be regarded with astonishment by those not admitted behind the scenes. Mr Thomson set in motion and inflamed by dramatic arts the popular enthusiasm into a raving Hargraves mania, and then quietly assumed the merit of yielding to the popular will in the grant of 10,000*l.* Several public gold companies and influential gold traders are said to have made brilliant offers, and even tendered direct bribes of large amount to Mr

Hargraves, while he remained a salaried official under Government at "the head of his department," and these declined proposals were urged by his advocates as a reason why the public gratuity to him ought to be increased, but in truth it was the Government official in power whom these parties wished to conciliate. None cared to employ the unprivileged abilities or judgment of Mr Hargraves as an individual, in any way connected with gold ; and the proof that this was the case is seen in the fact that none of these or similar offers were accepted after Mr Hargraves had ceased to be a Government official. Often has it been remarked to me interrogatively, Mr Hargraves must be a great geologist ? And when I have replied, "Oh no, Mr Hargraves does not make the smallest pretence to geology ; he neither knows, nor pretends to know, anything whatever of the science," the rejoinder has invariably been, "Oh, but he must be a great geologist, or else *Government never would have employed him.*" Thus the presumption has always been irresistibly favourable towards Mr Hargraves, and sometimes ridiculously so, because of the connexion between him and the Colonial Secretary. The natural consequence of this systematic and authoritative semi-deification was a public *furore* to honour and reward "Mr Hargraves, the gold discoverer." The protection of the Colonial Secretary, the State pageantries, the homage of public men, the eulogy of the public prints, all had an effect upon the public mind, which Mr Barnum, the showman, would have been delighted to witness. When the sudden accession of unanticipated wealth had already disposed the colonists to take the most liberal views of the matter, it was a perfectly easy task for the Colonial Secretary, with the artifice often practised by skilful rhetoricians, to carry captive the judgment of an audience by enlarging upon the advantages of the "gold discovery," and then attributing all the merit to one individual, without ever adducing the proofs of his being solely entitled to it.

The immediate substantial benefits which Mr Hargraves derived from public sources were a gratuity from the Government of New South Wales of 10,000*l.* ; a gratuity of 2,500*l.* from the Government of Victoria ; a gold cup in Sydney, of the value of 400*l.* ; a gold cup in Melbourne, of the value of 200*l.*, and a silver tea service in Bathurst, value 100*l.*, besides the salary of a Gold Commissioner for about three years, with the usual perquisites for forage, &c., and some considerable presents from private individuals. As an instance of the great moral influence of the press, it is said that one gentleman alone, a Mr Power, who had never seen Mr Hargraves, and knew him only from newspapers, presented him with 250*l.* Mr George A. Lloyd, a gold broker, in his public circular urged that 25,000*l.* was the smallest sum that the Government ought to grant to the gold discoverer, and it was intended that whatever sum the Government of New South Wales might grant Mr Hargraves, it should be taken as a unit, upon which to base other demands, first upon the colony of Victoria, and finally, upon the Imperial Government, for further pecuniary reward. Since the original pledge of Mr Thomson, in the name and upon the faith of Government, had been a promise of reward "in proportion to the magnitude and importance of the gold discovery," and New South Wales, Victoria, and the United Kingdom were severally calculated to have benefited in the ratio of 1, 3, 10, each would, consequently, be severally called upon to pay 10,000*l.*, 30,000*l.*, and 100,000*l.* to "the gold discoverer." Such was the entire scheme, which partially failed.

To the present day I remain utterly ignorant whether Mr Thomson was informed by Mr Hargraves that I had sent by him a letter from California on the subject of gold in the placer-deposits, or whether Mr Thomson ever learnt from him that I had in reality so effectually and extensively compared Australia with California—a comparison virtually carried entirely to the credit of Mr Hargraves. It is quite likely that these advantages of comparison were not known to Mr Thomson until more recently, nor can I suppose that he ever wished to be informed of them. Mr Thomson had every opportunity of learning direct from me, before the distribution of money gratuities, the circumstances which had moved Mr Hargraves when in California to search for gold when in Australia; but Mr Thomson unequivocally preferred his own arbitrary proceedings to impartial investigation.

Comparisons are proverbially odious; but to draw comparisons between Mr Hargraves and myself would be especially so. I would utter no unworthy complaint against my former associate, our claims and our interests in the gold discovery never having been opposed to each other, but always identical—the pre-determination of the Colonial Secretary to procure, on his sole account, a money reward, having alone made an apparent rivalry. The promise of a pecuniary reward in effect suborned my witness; for although we had agreed in opinion that a reward from the Government would be due after the demonstration, and we equally perceived that no pioneer of gold discovery could, in fact, reward himself adequately by merely appropriating to himself gold which he might dig out with his own hands—yet the contemplated reward had been official appointment, and not money-gratuity. The money-gratuity, however it might have been intended, had operated in reality as a bribe—a corrupt offering—a temptation to my former associate, during his subsequent public career, to disavow my claims altogether—to forget the gold-findings of Macgregor—to forget to acknowledge publicly that I had sent to Australia a letter by him—to forget that I had previously seen so much of the interior of Australia, and had then drawn my conclusions after observing the placer-deposits in California—to forget to report officially upon Goodgood—in fact, to forget everything, except the magnitude of his own rewards, which he claimed, says one report, "with a noble disinterestedness, unexampled in history."

In private life Mr Hargraves has at all times paid the utmost deference to my knowledge of gold mining—to my opportunities of comparison—to my advantages of travel, and to my philosophical investigations. In public life he has ever expressed himself in flattering terms of my ability, moral worth, and independent views, and in every matter which did not directly interfere "with the magnitude of his rewards," he has invariably professed his desire to serve me; but since the matter of the money gratuity was an after-arrangement between himself and Mr Thomson, I can but infer why, with all these professions of service and friendship, I have been so entirely set aside as regards public honours, and acknowledgment of services. Not the smallest pecuniary advantage has accrued to me from the gold discovery, but rather the contrary; while to all my former friends it has brought unbounded wealth, and although preferment in the public service had been the original stimulus which moved the enterprise, the stipulations with Mr Hargraves in this respect (notwithstanding that they had reached the knowledge of the Colonial Secretary so unpremeditatedly, through Mr Mort's citation of my letter at the public banquet), remain unfulfilled. Nevertheless, nearly every true allegation made in favour of Mr Hargraves by anonymous advocates in the newspapers, might be applied with equal force to my own particular claims, and in some instances much more so. My advantages of comparison had been in reality much superior to those of my companion. The letter brought by him to the colony from me, quite equalled in importance (as a fact from which the most stupendous consequences followed) "the almost invisible" specks procured by him in a district where the precious metal had already been frequently obtained; and while I alone held the master-key, which proved the few specks of gold to be in truth a new discovery, professional advocates, while pleading the cause of Mr Hargraves (not then being possessed of the knowledge and information requisite for the argument), did not hesitate to invent fictitious and illogical reasons, in order to prove the desired conclusion, that Mr Hargraves was "The gold discoverer." Thus by one pleader, Mr Hargraves is said to be "the first discoverer of gold," an allegation which is altogether untrue ; by another he is said to be "the first discoverer of a workable gold-field,"—whilst the evidence of Mr Lister and the Messrs Tom shows that Mr Hargraves entertained the lowest opinion of the *workability* of the particular Creek which they, after it had been despaired of, proved to be so rich in the precious metal. Mr Hargraves's own testimony is to the same effect, since it is but a very poor gold-field that would only pay ten shillings a day to men using a long-tom. The practical working of long-toms was, besides, quite unknown to Mr Hargraves at this time. Mr Hargraves had, in fact, only alleged to the Government the probable general productiveness of the colony, just as I had advised him to do, after he should have obtained the first placer-deposit gold, and never afterwards, in all his explorations, did he discover either the first gold or the workability of any gold-field—his subsequent gold-findings being invariably made upon fields where the diggers were already at work. The decision of the Legislative Select Committee, that Mr Hargraves had returned from California to Australia, "purposely to seach for gold," had always appeared to me only an amusing hyperbolical expresssion, and the reader may perceive by the "Minutes" it is a conclusion entirely unsupported by any evidence, unless the bare assertion of Mr Hargraves himself, when under the influence of a promised gratuity, be admitted as satisfactory testimony.

An angry correspondence appeared in the newspapers before my return to the colony, between Mr Hargraves and Messrs Lister and Tom. The character of the correspondence may be gathered from the minutes of evidence. The latter claimants alleged that Mr Hargraves had given up in despair the search for a gold-field of workable value in the western districts, while Mr Hargraves contended that he had in the interim been fully occupied in negociating for reward with the Colonial Secretary. The first four ounces of gold were found by the Messrs Lister and Tom after Mr Hargraves had left the district, and it is allowed by all that the workable value of this particular gold-field was decided on finding these four ounces. The Messrs Lister and Tom disavow that the spot where this gold was obtained had been pointed out to them more especially than other parts of the several watercourses, then ascertained to be auriferous, and Mr Hargraves's negociations with the Colonial Secretary before these four ounces were found, certainly referred only to the district in a general way. Which of them, however, may have the better claim to the discovery of the commercial value of this one gold-bearing watercourse, the matter certainly cannot be considered of vital importance to the general question, since it is only when the first obtained placer-deposit gold is regarded as the consummation of a prediscovered principle, and the inference of the generally auriferous character of the interior, are considered as based upon a previously acquired extensive observation of the geology of the colony, that it can be admitted, in Mr Thomson's words at the Sydney banquet, that " it had fallen to the lot of Mr Hargraves to prove that Australia was an immense gold-field." But philosophical principles Mr Thomson seems never to have cared to inquire into, and the geological comparison of the two countries Mr Thomson had pre-resolved to carry entirely to the credit of my late associate, when he should take into consideration the magnitude of his money reward. The Rev. Mr Clarke was certainly brain-racked by the Government to explain his own particular geological principles; but Mr Hargraves was considerately spared any torment of that kind.

It may be thought, possibly, that by maintaining silence at the time the gratuities were distributed, I have been guilty of injustice toward myself, and in self-justification it is to be observed;—first, that a money reward had never been contemplated by us in California ; and, secondly, that some of the evidence upon which I am now commenting, remained at that time unknown to me. I had not then been satisfactorily informed that Mr Hargraves, at the time of his washing out the first gold, was actually on the way to examine the alluvia near the two gold-bearing veinstones already discovered,—namely, first, the one previously ascertained to be auriferous, on Mr Icely's land at Canowindra ; and, secondly, the more notorious gold-bearing veinstone near Wellington ; nor was I then aware that Mr Lister had already sought for gold in the goldless quartz-veins which cross the rich gold-bearing bed of Summer Hill Creek. I was at the time but imperfectly acquainted with the topography of this particular district, and hardly knew, in the first instance, that Guyong and Summer Hill Creek were so exactly, as they are, on the direct road to the Wellington auriferous quartz-vein. I found for certainty, in the evidence of Messrs Lister and Tom, long afterwards, that

Mr Hargraves had acknowledged to them the fact of his being *en route* for it when they together examined Summer-hill Creek. The exaggerated statements of the newspapers alleged that Mr Hargraves had in his mind's eye, when in California, fixed upon a certain place in Australia, which he had only once passed over seventeen years previously; and before reading the Minutes, I supposed that possibly this highly-coloured statement might have some foundation in truth; but after perusing Mr Lister's testimony, and recalling our conversations in California, and finding also that Mr Hargraves had, before the Gold Committee, denied all knowledge of the gold-findings near Wellington, my own claims and services, and especially my written letter, which referred with exactitude to several gold-bearing localities, appeared under a very different aspect. Had I known all these circumstances when the gratuities were under consideration, I might, possibly, have acted differently; I now think that the Colonial Secretary neglected his duty to the public, and served me very unjustly, by not rigorously investigating them. I had myself no participation in the scheme for obtaining a gratuity in public money for the gold discovery, and while the Legislature took into consideration what compensation ought to be made for the services rendered by Mr Hargraves, it was surely not for me to offer any opposition to their liberality. Mr Hargraves was fairly entitled to my best support. In effect I did support his interests much better by remaining silent respecting the gold-findings of Macgregor than by officiously enlarging on them, when the information was not wanted. The question proposed by the Legislature of New South Wales was not,—Who has made the gold discovery, considered as an indivisible whole? but the question appeared to be—What do the particular services of Mr Hargraves deserve? Whether ten or a hundred thousand pounds might be granted to him was to me a matter of personal indifference. The Legislature of Victoria do profess to have invited all persons concerned in the gold discoveries to bring forward their claims; but certainly the Legislature of New South Wales did not put the question in that way. With respect to the colony of Victoria, I repeat, that I was not there at the time of the alleged public notice, and did not even hear of the invitation, while Mr Hargraves, on the contrary, was advised officially to appeal to it; and his representations to the Government of that colony were suggested and forwarded by the Executive Government of New South Wales. So that without any further trouble the Legislative Committee of Victoria concluded, without investigation, that the *ex-parte* evidence taken in Sydney established Mr Hargraves's exclusive title satisfactorily to the gold discovery as an undivided whole.

The late Chief Gold Commissioner, Mr John Richard Hardy, shortly after his office had been abolished, published in Sydney a little pamphlet, entitled 'Squatters and Gold-diggers;' some of my earliest theoretical letters had then appeared in the public prints, and Mr Hardy observed in the pamphlet, that "Whether gold has been washed down from the tops of the mountains, or upheaved from the depths of the earth, was not of the slightest consequence;" but that he (Mr Hardy) was the only proper person to be entrusted with the management of the gold-fields, since he had originated the first regulations. Now, the ordinary and liberal regulations for gold-mining in alluvia as they existed in California (with only the addition of a licence fee), had, solely in consequence of Mr Hargraves's representations, been first accepted in the colony; for we had arrived at the conclusion in our tent in California, that these regulations ought to be, as they were in their main features, adopted in Australia. No information on this subject, however, was laid before the Legislative Select Committee, nor were the gold-findings of Macgregor on the veinstone near Wellington, important as they had been in contributing to the gold discovery, ever made the subject of Legislative inquiry, as they undeniably ought to have been, if "the gold discovery" had been the veritable object of its investigations. The simple denial of any previous knowledge of the gold-findings near Wellington, when ten thousand pounds hung upon a negative reply, with Mr Thomson as interrogator, and Mr Hargraves as respondent, was the only sort of testimony submitted to it.

Although it had been planned in California that Mr Hargraves should first become appointed a Gold Commissioner, and then, in gratitude to me, procure my advancement to a similar dignity, it had never been in contemplation between us that he should appear in Australia as a Commissioner of Exploration. This appointment was subsequently arranged for him by Mr Thomson and Sir Charles Fitzroy; and although Mr Hargraves possessed so little of either qualification or inclination for the duties of the office, the idea itself of employing an explorer of experience who should, at the public charge, compare remote and various gold districts with each other, has always appeared to me to be legitimate in intention. Since some parts of Australia had been demonstrated to be prolific in placer-deposits of gold by comparison with California, why not extend the comparison both to unexplored districts and to other colonies? No gold-digger could do this service at his own charges without losing by the adventure, if his sole prospective reward were to be the gold which by his own hands he might obtain from the earth. How infinitely much more likely to prove beneficial as regards gold discovery would be such a method of examination than that of any merely scientific expedition of persons practically unacquainted with gold-mining and with the actual condition of gold deposits. Such considerations, and the promised Commissionership, very much induced my leaving Bendigo in 1853, for few persons in the world had then had more gold-mining experience. At the time when making a public address in Bathurst, I had recently visited within a few months three of the greatest gold-mining centres in the world, widely remote from each other, and at two of them I had been actively engaged; these were Moquelumne Hill in California, Bendigo in Victoria, and Sofala in New South Wales.

The gold from Brazil, both in matrix and in placer-deposits, of which a large number of samples is exhibited in the British Museum, presents many peculiarities in comparison with the gold of Australia and California,—peculiarities which are quite unknown to the experienced gold miners of the two latter countries. The extraordinary matrix from Gongo Soco and the flour-fine samples of gold from the washings in Minas Geraes are especially deserving of study. One specimen from Peru in the Museum is exactly similar to the peculiar gold pebbles of Coromandel Harbour in New Zealand, but the most remarkable kind of gold, to my thinking, is the fibrous metallic gold labelled "Ribbon Gold," spread upon the laminæ of slate apparently in the direction of cleavage. I have seen none approaching this character in nature. The normal condition of placer-deposit gold is, however, by no means well exhibited in this institution, but chiefly specimens in rocks which are curious and exceptional. The very fine character of the alluvial gold from the "lavarados" of Minas Geraes is essentially different from the alluvial gold in Australia and California. It would be quite an error to suppose that extremely small gold of this kind is, in the latter countries, lost for want of skilful manipulation. Such alluvial gold does not appear to exist in them. I scarcely need explain that I do not mean to aver that there is positively no exception to this statement. I mean that such is not the ordinary mode of its occurrence at the placer-deposits, or in any part of the soil of Australia and California. The analogy which I have previously offered of the metallic grains of placer-deposit gold having been formed from atomic conditions like rain-drops in the atmosphere, where the molecular aggregations at each deposition are dependent on cooling conditions, and in size somewhat equal at each deposition, yet varying in size greatly on different occasions—seems to me clearly explanatory of this difference in the size of deposited gold grains and dust. The granite gold of the Rocky River, for instance, is in very small grains—say about the size of mignonette seed—gunpowder gold it has sometimes been called—there are no large nuggets connected with it, but then neither are there in quantity any still smaller particles of the flour-like fineness of the Minas Geraes gold-washings. Explorers and novices frequently allege that in practice the gold-diggers lose all the fine gold for want of proper manipulation, but the fact is that very fine gold of the kind I am treating of is not present at the diggings in any abundance, and, as a mere question of economy, it is often more advantageous to throw aside the washing refuse with a great deal of gold yet remaining in it than to expend extra time and labour in more careful manipulations—a subsequent process upon a more wholesale scale answering the purpose better; yet, notwithstanding this mistaken idea of those novices who think they can teach gold-washing to "the rude and illiterate diggers," it does, nevertheless, frequently happen that inexperienced gold-searchers lose a good deal of gold owing to awkward manipulation.

A critical examination of the gold-fields of Brazil, if made on the spot by any intelligent person experienced in the gold mines of Australia and California, might probably prove highly advantageous to the Australian colonies. A Mr Harding—the great Brazilian gold-miner, as one of the local newspapers described him—looked in 1853 at some of the gold districts in New South Wales with the intention of working the auriferous veinstones there, if he should discover any like those of which he had had experience in Brazil; but this gentleman, whose greatness in gold-mining probably consisted chiefly in his having had a lucrative engagement upon one great gold mine, failed to find any veinstone of similar kind in New South Wales during his very short stay in the colony. There lingered near Wellington an anecdote respecting him which I heard during my first visit to that locality to the following effect: While Mr Harding was being courteously shown some of the quartz-veins in the neighbourhood, he said to the shepherds and guides who had accompanied him, "Show me the gold, and I am the man to work it!" But the shepherds there having a very lively recollection of the hundred pounds lump of gold found upon the quartz vein at Louisa Creek, replied to the great Brazilian gold-miner, from whom, as a gold-discoverer, they had entertained such exalted expectations, "Oh, if you will show us the gold, we are the men that can work it ourselves!"

It is one of the curious facts connected with the gold discovery that Mr Hargraves had never during his Californian experience seen a gold-bearing quartz vein to know it as such; and although his first endeavours to discover placer-deposit gold in Australia were directed towards the gold-bearing quartz veins discovered by Mr Icely, and by the shepherd near Wellington, yet Mr Hargraves, in consequence of his never having seen a gold-bearing quartz vein, did not, on inspection, find any gold whatever upon either of them. The few specks of gold, however, which he had already washed from the earth under Mr Lister's guidance on Summer-hill Creek, having previously established the fact of the existence of the precious metal in placer deposits had had also the effect of rendering it desirable that Mr Hargraves *should not find* any gold in the quartz veinstone near Wellington. Mr Hargraves subsequently, on accepting the office of Crown Commissioner for gold explorations, was officially instructed to examine again the gold-bearing quartz vein near Wellington, since the Colonial Secretary had now received, from various quarters, more full information of Macgregor's gold-findings. It is perfectly astounding that Mr Hargraves, who had never in California been shown a gold-bearing quartz vein, and who confessedly knew nothing whatever of the science of geology, should have been despatched by the Government to report upon so important a matter. Mr Hargraves, of course, could not render any material service in this case. He appears, from his own account, to have proceeded in the direction of the veinstone under the guidance of Mr Brockstayn, a jeweller, whose wife's former husband had been in the habit every year of buying Macgregor's gold; but Mr Brockstayn never having himself viewed the veinstone, the two explorers, after some angry recrimination on the way, returned without either of them seeing any of the precious metal in the quartz vein. Still Mr Hargraves records of his previous visit that it was *not difficult to discover where the old shepherd procured his gold, though he (the shepherd) had not touched the alluvial soil.* This alleged easy discovery is the more astonishing since Mr Hargraves had never in his life anywhere seen gold in quartz veins, nor did he find any on this occasion.

The Great-nugget-vein Gold-mine, from the circumstance of its gold occurring in large lumps in white quartz, excited in the public an inordinate cupidity on its first announcement. Great nuggets of gold, by appealing directly to the senses and passions, invariably do excite feverish and unfounded hopes. The massive lumps of gold caused the shares of this company at the beginning to be held in high favour, without there ever having been, in my opinion, any probability of the costly adventure proving eventually remunerative. As a contrast to the large gold of the Great-nugget-vein, the gold mine of Gongo Soco in Brazil (the richest probably ever worked) exhibited its gold in a black matrix, in extremely small particles, and yet this mine produced upwards of two millions of pounds sterling in a few years! The Wellington veinstone materially differs in character from either of these, and chiefly contains its gold indistinctly visible in an extremely minute state of diffusion, and mostly in association with iron, in red oxides, hydrates, and sulphurets, still all within a quartz matrix—the ore more nearly approaches in character the specimens from the gold mine of Beresof, in Russia, than any other foreign samples that I have seen. The gold mines of the United States of America, of Melho Vallo in Brazil, and of Hungary in Europe, where the precious metal in many of them *is never visible*, but only extracted by amalgamation from auriferous pyrites contained in a quartz matrix, differ again essentially from any of those above-named.

There is a fallacy often advanced which affirms that gold-mining is invariably less profitable than the mining for baser metals. A few words will, I think, correct this delusion. There is, in fact, no other mining nearly so profitable to all employed as gold-mining. In all the mining adventures of base metals, coals, or any other minerals, a totally different system of mining rights is usually established either by law or by custom. There are in most cases of ordinary mining, one, or a few proprietors only, who have acquired exclusive possession, by purchase or by grant, of large tracts of mining land; the labourers employed on hire to bring the mineral to the surface do not, therefore, participate in extraordinary profits, but are paid comparatively low and fixed wages. The proprietors in successful mines of this kind make their profit upon the work of the labourers, which their monopoly enables them to employ at ordinary low wages. In gold-mining, especially in placer-deposit diggings, it is not so; no large tract of mining land is upon any terms appropriated or granted exclusively to one or a few proprietors, so that, whenever an eminently successful field is opened, every man—each mining labourer, and every indirect auxiliary—participates in the advantages of the treasure-trove. There is in such case no profit made by monopolists upon the labour of other men engaged at low wages. It is this difference which makes the mining for base metals more profitable to the proprietors. An exclusive grant in the first instance of half a mile of auriferous ground upon such gold-fields as Ballarat or Bendigo, with hired labour obtainable at such moderate rates as prevail in England, would have proved more profitable to the proprietor than any equal sized piece of ground has ever done in the same short time in mining for the base metals or for coals. It is simply the difference of tenure, with the subjugation of labour, which in some cases makes coal, copper, or iron mining more profitable than gold mining to a few individuals. The recompense to labour in a successful gold mine is infinitely greater of the two, only the variable profits derived from it are less unequally divided than in a mine of any other mineral.

It may perhaps by some be thought that in commenting upon the arbitrary preference and premature decision of the local Government, which, upon the first intimation to it of the "gold discovery," pledged itself at once to reward Mr Hargraves "in proportion to its magnitude," without any reference to the question of his independent or delegated mission, I have no cause to complain, since an equivalent it may be alleged has been subsequently awarded to me by concession of the auriferous veinstone near Wellington. But I must observe that there is a wide difference between permission to undertake the risk of one single hazardous enterprise, and the threefold reward of public honours, a Crown Commission, and a free grant of public money for general discovery unattended by any risk whatever. The one may fail from illness, exhausted resources, or ruinous litigation, while the other is placed beyond the malice of ill fortune. Legitimate and laudable ambition besides is not of the same kind in all men. The desire of fame and the aspiration to high employment in the public service are motives no less powerful with many than the mere lust of wealth. The former more noble motives actuated Mr Hargraves at the time of his leaving California, but these exalted motives had apparently on my reaching the colony ignobly degenerated under the tutelage of the Colonial Secretary into mere greed of gain. The local Government, in granting to me the quartz vein upon payment of the usual fees, did not at the same time render any acknowledgment of public services in connexion with the gold discovery, while the grant itself nearly became nugatory, or rather it became indefinitely suspended, in consequence of a subsequent alienation of the approaches to it; and it is only by having purchased these approaches at a great cost in money, as well as after a great sacrifice in time, that the grant is ever likely to become available to me, and at best such a recompense was not the original object which prompted the gold discovery, nor one which either Mr Hargraves or myself ever contemplated as being the sort of compensation which a successful enterprise deserved at the hands of a generous and powerful Government.

The administration of the Government of New South Wales it must, however, be stated, had entirely passed into other hands between the time when the promise of lease of the Wellington quartz-vein was conceded to me by Governor-General Sir Charles Fitzroy, and the time when the approaches to it became alienated. The first responsible premier of the colony chosen under the new constitution by his Excellency Governor-General Sir William Denison, was Mr Stuart Alexander Donaldson, and Mr Donaldson had himself already been adventuring in the occupation of auriferous quartz veins. The very quartz vein in question, although never I believe seen by him, had previously been registered on his account to the extent of three half-mile claims by means of his agent, Mr Gideon Lang; so that it does not appear to be altogether impossible that the proto-premier of responsible Crown Ministers in New South Wales may, by having thus allowed the land in question to be put up for sale, have been virtually planning to obtain indirectly possession of the veinstone on his own account by securing the approaches to it through a subordinate instrument. It is on record in a published official return, that in 1852 no less than one hundred and sixty-three half-mile quartz claims had been registered with the Government of New South Wales for gold-mining purposes. Of these probably very few contained gold; they had mostly been applied for only upon the speculation of their subsequently proving to be auriferous. As soon as an application fee of twenty-five pounds each became required under the new regulations, they were nearly all abandoned. Mr Lang, as the agent or associate of Mr Donaldson, had also registered three other consecutive auriferous quartz claims on the Great Nugget Vein at Louisa Creek, in addition to those on the Macgregor Vein near Wellington, and the registration of the former had led him into high dispute with Mr William Hardy, the brother of the Chief Gold Commissioner, who became consequently suspected of being tampered with the registration-books in favour of his near relation. The evidence before the Gold Committee of Mr Donaldson exposes the fierce contentions of the time.

besides revealing the eagerness with which men of capital and influence, without possessing the requisite special knowledge, sought to appropriate to themselves the most valuable mines with no other trouble than that of merely registering applications. (See Appendix H.) Special knowledge, however, is fortunately no less valuable than money capital in mining pursuits, and without this indispensable requisite no commercial adventure can be more ruinous to capital than the hazardous, although sometimes excessively lucrative, occupation of gold-mining.

In conclusion—a new discovery either has or has not been made in relation to Australian gold-deposits; if no new discovery has been made since the several occurrences of the gold prediction of Murchison, of the gold discovery of Clarke, and of the gold-findings of Macgregor—which all preceded the discovery made by Mr Hargraves, then the few specks of gold found by the latter dwindle as a discovery into the smallest insignificance. Sir Roderick Murchison, by a late public speech, still seems disposed to adhere tenaciously to the "abrasion" doctrine, although judiciously maintaining silence respecting the doctrine of "equable dissemination," thus apparently denying by imputation the fact of any new discovery having been made. Yet, if such were truly his deliberate decision, a burst of indignation might have been expected against the implied injustice done to himself and to his scientific *confrères* by the large differential rewards and public honours awarded to the alleged first discovery of Mr Hargraves. If, on the other hand, a multitude of new facts concerning gold-deposits have been brought to the cognizance of professional men of science or placed within their reach, and if these recently-acquired facts in physics substantiate the new gold discovery, why do the professedly-scientific men continue so disingenuous as to delay admission of its truthfulness? Why so tardy in confessing their own early errors, and in acknowledging the just conclusions of more practical men? The men of science have yet neither denied nor accepted the placer-deposit gold discovery in Australia as a novelty distinct from the previous matrix gold discovery. It has been left to other philosophic inquirers—to diligent and practical observers who do not boast of having been enrolled as privileged men of science—to corroborate the fundamental facts upon which the important discovery in Australia of gold in placer-deposits was made in 1851.

It is another strange circumstance that when the early [illegible] from Australia of practical gold-diggers and other local examiners (Governor Latrobe included) described alluvial or placer deposit gold as "looking as if it had been melted," so little weight should by men of science generally have been given to the apparent fact that one learned professor, without even offering any other solution of its origin *when in an unabraded state*, capriciously rejected the repeated and valuable evidence as being "probably a mistake." When my own lengthened observations upon the gold-fields had led me not only to mark and speculate upon the phenomena of placer-deposit gold having been apparently melted, but also evidently *moulded upon the bed-rock*, no recognised man of science or literary eminence appeared to possess sufficient information even to admit (under his proper signature) the simple fact upon its first publication, until Mr Howitt having acquired a practical experience on the gold-fields of Victoria, and then making a just use of his own eyes and judgment, not only corroborated the plain fact, but also most emphatically confirmed the conclusion of the metal having been melted on the floor with a decision which is quite cheering amidst so much scientific pusillanimity, by his unequivocal affirmation that "you could not be more convinced of its having been thus deposited if you had seen it done." Negative evidence is less satisfactory in proof of principles than a positive fact like the foregoing, yet a public challenge in a gold-mining community, when responded to by independent experiences, must afford to impartial minds infinitely more satisfaction on the question of "equable dissemination" in granite and slate than could be obtained from the imaginary data of any number of men of science whose conjectures have no foundation in nature; the negative evidence also afforded by the absence of marine fossils upon any placer-deposit of gold, although one of the negative facts respecting which the merely practical gold-diggers are mostly quite indifferent, presents itself nevertheless to philosophical minds as one to which men of science ought to be especially alive, and one which in the abrasion doctrine seems heretofore to have been entirely overlooked by them.

Theory, the men of commerce have recorded, is worthless for all practical purposes, and practical experience, retort the men of study, is a chaos without methodical and scientific arrangement of the facts which have been already collected—in other words without a theory—but both theory and practice would have been of slight avail for the inductive discovery in Australia of gold deposits, widely spread in patches on the slopes of its eastern Cordillera, unless united with the third most essential requisite of extensive comparison. Without the slighest embellishment I may truthfully aver that in the year 1851 I had acquired the three essential requisites in a greater degree than had been acquired by any other individual, and if the whole of the gold discoveries in Australia can be adjudged to be the result of any one single action I may as justly claim the act of having written, for the guidance of my associate, a letter founded on this comparison and induction, to be the primordial action which moved the mighty consequences, as others severally allege the washing of the first dish of auriferous earth, or the chipping off the first piece of gold from a vein of quartz, to be the particular act from which all the discoveries and developments of gold in Australia have resulted.

The first discovery in Australia of quàrtz-matrix gold—first both in time and in quantity—is unquestionably that made near Wellington by the shepherd Macgregor, however reprehensible may have been the conduct of this person for the vain endeavour to keep perpetually secret the locality of his gold findings;—the subsequent discovery of placer-deposits, which in their development have already produced gold of the enormous value of ONE HUNDRED MILLIONS OF POUNDS STERLING, and quite thrown into shade the early and romantic gold discoveries of the Spanish invaders of America, is nevertheless one of the greatest facts of the age, and while I can in this discovery do full justice to the part taken and to the services rendered by my former associate, it is but fulfilling a duty to protest against the monstrous doctrine that "discovery has no parts," and without idly discussing whether the sender or the person sent be of the two entitled to the higher and more lasting honour, it is obvious that my own services and particular claims have not been cancelled or in any way diminished by the subsequent proceedings of those who were deeply interested in ignoring them.

APPENDICES.

APPENDIX A.

THE GOLD FIELDS OF CALIFORNIA.

THE discovery of gold in California is popularly dated from the time, late in 1848, when a Mr Marshall, a resident at Fort Suttor, while cutting a mill-race on the American river, near the site of the present city of Sacramento, accidentally dug up a few particles of the precious metal. Captain Suttor's mud Fort had been originally erected by Russian authority to protect Russian fur-traders against wild Indians; and in subsequent treaty the Fort, with some surrounding territory, had been conceded to Captain Suttor by the Mexican Government. The gold-findings of Mr Marshall were speedily followed by a general rush thither of American citizens, numbers of whom had recently been relieved from military service in consequence of a recent treaty of peace concluded between the Republics of Mexico and the United Anglo-American States. Under the terms of this treaty the territory of Alta-California became ceded in perpetuity to the latter power. It can, however, hardly be doubted that long previously gold had been known to exist in California, although the knowledge may have been unwisely suffered to slumber. In every old gazetteer and physical description of California, the auriferous character of the country appears distinctly recorded, "gold" being invariably enumerated amongst its valuable products. It is uncertain whether or no the Jesuit fathers, who, to civilise the aboriginal Indians, founded great missionary establishments in California (where their influence yet remains strongly impressed upon the inhabitants) had any especial knowledge of the auriferous character of the land. The probability appears to be that they had not. But still in all well-informed quarters, as well as in popular accounts, California has always been considered to be gold-bearing since the time of the early Spanish conquests in the New World. A short time before the treaty of peace above-mentioned, an exploration under command of

Colonel Fremont had been despatched to California by the United States Government. Colonel Fremont crossed the Rocky Mountains, and then officially made a survey of this part of the Mexican territory. Now, one of the remarkable circumstances connected with Colonel Fremont's expedition is that he purchased in California, at his own venture, a valuable tract of auriferous land—the since celebrated Mariposa grant—and this tract of land is the *only auriferous land* which had then been alienated to private individuals by the Mexican Government—all other auriferous tracts in California still remaining the property of the State. The Mariposa grant contained extensive gold-bearing quartz-veins, which, some years afterwards, were sold or negotiated at great advantage to a public company. Taking these circumstances into consideration, it seems highly probable that Colonel Fremont was fully aware, at the time of his making the purchase, that the quartz-vein contained visible gold. But the greater value of placer-deposits in California generally does not appear to have been anticipated by him ; indeed, so long as alluvial gold continued to be considered by scientific authority as merely the disintegrated portion of gold-bearing veinstones, it was quite natural for every adventurer to seek to possess the supposed source of alluvial gold—the veinstone itself—as Colonel Fremont did. No eminently rich placer-deposits of gold, however, have yet been found on Colonel Fremont's grant of auriferous land at Mariposa; but the veinstone is nevertheless said to be an extensive one. And this instance affords another proof, among many, of the independent character of placer-deposits of gold and the worthlessness of the doctrine of their derivation from quartz matrix.

The modern political divisions of that part of the world, which was all formerly included under the general name of New Spain, only perplex the reader when contemplating a general physical description of that portion of America; the whole northern part of Mexico and the adjoining territories subject to Spain, not unfrequently being called California in former times, as well as the two provinces of Alta-California and Peninsular California. The following popular description of the territories in question, from Robertson's 'America,' is not only highly graphic in itself, but the writer, besides distinctly narrating the auriferous discoveries of a long prior date, really throws a great deal of light on the mode of occurrence of gold in placer-deposits ; the unprepossessed reader will gather from it no expressions even inferentially favourable to the quartz-abrasion hypothesis—the account, in fact, being a much more faithful description of gold-producing districts than scientific geologists in later times have usually given of the physical condition of placer-deposits of gold. The following is Robertson's description of California, dated 1788 :

"The jurisdiction of the Viceroy of New Spain extends over several provinces which were not subject to the dominion of the Mexicans. The countries of Cinaloa and Sonora that stretch along the east side of the Vermillion Sea or Gulf of California, as well as the immense kingdoms of New Navarre and New Mexico, which bend towards the west and north, did not acknowledge the sovereignty of Montezuma or his predecessors. These regions, not inferior in magnitude to all the Mexican empire, are reduced, some to a greater, others to a less degree, of subjection to the Spanish yoke. They extend through the most delightful part of the temperate zone. Their soil is, in general, remarkably fertile ; and all their productions, whether animal or vegetable, are most perfect in their kind. The number of Spaniards settled in those vast countries is indeed extremely small. One circumstance may contribute to the speedy population of some districts. Very rich mines, both of gold and silver, have been discovered in many of the regions which I have mentioned. Wherever these are opened and worked with success a multitude of people resort. In order to supply them with the necessaries of life, cultivation must be increased, artisans of various kinds must assemble, and industry as well as wealth will be gradually diffused. Many examples of this have occurred in differents parts of America since they fell under the dominion of the Spaniards. Populous villages and large towns have suddenly arisen amidst uninhabited wilds and mountains; and the working of mines, though far from being the most proper object towards which the attention of an infant society should be turned, may become the means both of promoting useful activity and of augmenting the number of people. A recent and singular instance of this has happened, which, as it is but little known in Europe and may be productive of great effects, merits attention. The Spaniards settled in the provinces of Cinaloa and Sonora had been long disturbed by the depredations of some fierce tribes of Indians. In the year 1765 the incursions of those savages became so frequent and so destructive that the Spanish inhabitants in despair applied to the Marquis de Croix, Viceroy of Mexico, for such a body of troops as might enable them to drive these formidable invaders from their places of retreat in the mountains. . . . In the course of this service the Spaniards marched through countries into which they seem not to have penetrated before that time, and discovered mines of such value as was astonishing, even to men acquainted with the riches contained in the mountains of the New World. At Cineguilla, in the province of Sonora, they entered a plain of fourteen leagues in extent, in which, at the depth of only sixteen inches, they found gold in grains of such a size that some of them weighed nine marks, and in such quantities that in a short time, with a few labourers, they collected a thousand marks of gold in grains, even without taking time to wash the earth that had been dug, which appeared to be so rich that persons of skill computed that it might yield what would be equal in value to a million of pesos (250,000*l.*) Before the end of the year 1771 above two thousand persons were settled in Cineguilla, under the government of proper magistrates and the inspection of several ecclesiastics. As several other mines, not inferior in richness to that of Cineguilla, have been discovered both in Sonora and Cinaloa, it is probable that these neglected and thinly inhabited provinces may soon become as populous and valuable as any part of the Spanish empire of America.

"The peninsula of California on the other side of the Vermillion Sea seems to have been less known to the ancient Mexicans than the provinces which I have mentioned. It was discovered by Cortes in the year 1536. . . . Towards the close of the last century the Jesuits, who had great merit in exploring this neglected province and in civilising its rude inhabitants, imperceptibly acquired a dominion over it as complete as that which they possessed in their missions in Paraguay, and they laboured to introduce into it the same policy, and to govern the natives by the same maxims. In order to prevent the Court of Spain from conceiving any jealousy of their designs and operations, they seem studiously to have depreciated the country by representing the climate as so disagreeable and unwholesome, and the soil so barren, that nothing but a zealous desire of converting the natives could have induced them to settle there. Several public spirited citizens endeavoured to undeceive their sovereigns, and to give them a better view of California, but in vain. At length, on the expulsion of the Jesuits from the Spanish dominions, the Court of Madrid, as prone at that juncture to suspect the purity of the Order's intentions as formerly to confide in them with implicit trust, appointed Don Joseph Galvez, whose abilities have since raised him to the high rank of Minister for the Indies, to visit that peninsula. His account of the country was favourable; he found the pearl fishery on its coasts to be valuable, and he discovered *mines of gold* of a very promising appearance. From its vicinity to Cinaloa and Sonora, it is probable that, if the population of these provinces shall increase in the manner which I have supposed, California may, by degrees, receive from them such a recruit of inhabitants as to be no longer reckoned among the desolate and useless districts of the Spanish empire."

The American geologist, Professor Dana, personally examined the geology of California, and actually travelled over the auriferous districts a few years previously to the gold-findings near Suttor's Fort in 1848, and Professor Dana *found no gold whatever;* still he very safely concluded, in a vague and general way, that *California ought to be gold-producing,* since not only did popular authorities, like the one above quoted, inform him so, but he also found in his explorations that the prevailing rocks there were of the igneous and metamorphic class. The Senate of California, in 1853, despatched Professor John Trask to make a scientific report upon the gold-fields now opened, and Professor Trask arrived at the conclusion that the auriferous drifts had been deposited in a late tertiary epoch. The fact of quartz-veins being destitute of gold so frequently in the midst of placer-deposits of gold was noticed by him with these explanatory words—"that the slates and schists had often been the retaining medium of the metal when in connexion with quartz-veins that were not auriferous"—an observation which furnished matter of argument in favour of the equable dissemination doctrine to a writer in the Sydney journals, but which is nevertheless quite intelligible on the interpretation of their having retained the metal on the surface only. The geognosy of the gold drift in California had been communicated to the 'American Journal of Science and Art' at an earlier date by Professor Blake, and except that the author appears to have been impressed with an idea that the greater amount of drift and debris in the plains might prove to be as prolific in gold as the placer-deposits beneath the drift in the more elevated localities, his independent observations and views are highly instructive.

Professor Blake states that, "with the exception of the diluvial strata, the whole geological formation of the Sierra Range consists of igneous and metamorphic rocks: the former are mostly porphyritic in the lower hills, whilst higher up trachytic rocks are more frequently met with. The metamorphic rocks consist of micaceous schists, slates both talcose and micaceous, metamorphic sandstones and limestones, with occasional beds of conglomerate. The stratified rocks have been much displaced; it is rare to find them with a dip of less than 70°, and they are generally very nearly perpendicular. The strike of the beds in that section to which my observations have been confined (between the Stanislaus and Yuba Rivers) is extremely uniform, being from 5° to

10° W. of N. and E. of S. The extent of the diluvial deposits is commensurate, or nearly so, with that of the gold-bearing region, in that part of the country which I have examined. They are found in a belt of land from thirty to sixty miles broad, and running parallel with the axis of the range; and, from facts that I have ascertained from others, I have no doubt but that they exist throughout all the gold-bearing region, both north and south. These diluvial deposits are met with as we advance towards the lower hills of the Sierra, extending frequently some miles into the plain. On ascending from the lower hills towards the mountains, the diluvial beds no longer occupy the same relative position: occasionally deposits of rounded stones can be found in the valleys and on the sides of the hills, but when this is the case their origin can always be traced to deposits existing on the tops of the surrounding hills, from which they have been brought down by the action of the causes now at work. As we ascend towards the axis of the chain, these deposits become more extensive, and at a distance of twenty or thirty miles from the lower hills, they are found occupying the crests of almost all the highest ridges in the country; but besides being found on the crests of the ridges, where their extent frequently does not exceed a few yards in breadth, they are also met with covering the extensive elevated flats which exist on the benches between the different watercourses, forming continuous beds of some miles in extent, which are rarely interrupted by the protrusion of any of the older rocks. Where found in these elevated situations, the lower hills and valleys are entirely free from them; frequently a large section of the country will be enclosed from two high ridges capped by deposits, and diverging from a common point; in the intervening space will be seen many secondary ridges, sometimes fifteen or eighteen hundred feet high, formed entirely of the older rocks, no traces of deposits being found on their surface, nor in the ravines that lead from them.

"The depth of these deposits is extremely variable. Sometimes nothing more than a trace of them in the presence of a few round pebbles lying on the top of a ridge is found; the valleys and ravines in the neighbourhood containing their disintegrated elements in considerable quantities. In other instances, particularly where spread out over the elevated flats, they are of a moderate and pretty uniform thickness for a considerable distance, varying from two or three feet to a few inches, and this, too, in positions where the surface could not have been exposed to any great amount of denudation. They are again found many hundred feet in thickness, composed of superimposed strata of different mineralogical constitution, generally horizontal and conformable with each other.

"The localities where these deposits are met with most extensively disclosed, and that have been worked, are at Nevada and at Mokelumne hill. At the former place they form the crest of a high mountain called the Sugar Loaf, full 2,000 feet above the level of Deer Creek, the upper 600 feet being formed entirely of diluvial strata. At Mokelumne hill they are also some 200 feet deep, forming here also the summit of a high and isolated mountain. The elements of which they are composed differ considerably in different localities, although there are through the whole series many points of resemblance. In the lower valleys and flats, between the ranges of the lower hills, they appear to consist of beds of gravel, containing occasional boulders of quartz, and the harder rocks. On the elevated flats higher up in the mountains, the surface of these deposits is generally covered by a reddish loam, mixed with small gravel; whilst reposing on the bed rock, and a few inches above it, is found a stratum containing large boulders and gravel, the boulders being principally quartz. On the tops of the hills and the crests of the ridges, where they generally attain their greatest thickness, we find them composed of many distinct strata lying nearly horizontal, and conformable with each other, and generally also with the surface of the underlying rock. In these situations the most superficial stratum is composed of a mass of extremely hard conglomerate, containing principally trachytic rocks, imbedded in a hard argillaceous cement. It is this hard stratum that has undoubtedly preserved the underlying beds from the destructive influences which have so powerfully acted on the surrounding rocks.

"At other points the whole series consists of conglomerates and soft friable sandstone. In the lower strata, quartzose conglomerates, with an argillaceous cement, or loose quartzose gravel, always prevails, with large boulders of quartz, weighing frequently two or three tons, having their surface worn smooth and the angles rounded. The deposits of these heavier rocks have been formed on spots which were evidently lower than the level of the surrounding rocks; whilst on those parts which were higher at the time the deposits were formed, the higher trachytic rocks are found. As far as my researches have extended, the more quartzose conglomerates have been invariably found on the erupted rocks, whilst the stratified rocks which they had upheaved were only covered by the trachytic conglomerates. The pebbles of which these conglomerates are composed present specimens of all the harder rocks. Metamorphic sandstones, clinkstone, trap porphyries, and quartz, make up the larger part of the mass. They are all perfectly rounded, but in the lower deposits are so soft, that, with the exception of the trap and quartz, they generally fall to pieces on exposure to the air. The strata, as before observed, are nearly horizontal and conformable: if they have any dip, it appears to have been owing to the slope of the surface of the rock on which they were deposited; in fact, no displacement seems to have taken place in this country since the period of their formation. They lie perfectly horizontal over the almost vertical edges of the upheaved slate rocks.

"As regards the mineral riches of these deposits, it would appear that gold is found wherever they exist. The ravines coming from the ridges on which they are found are generally extremely rich, and always contain gold, even in places where the deposits themselves have been worked without success. In some places where they have been worked, as much as thirty thousand dollars have been taken from a claim of fifteen feet square; and there are many instances where ten and fifteen thousand dollars have been taken from claims of the same size. But few of these rich spots have, up to the present time, been opened, yet there can be no doubt but that many still remain to be discovered. Where these deposits are found extending over a large surface on the elevated flats, gold is always met with, generally diffused through the gravel immediately above the rock on which they rest."

To the northward of modern California the sea-board comprises the state of Oregon and the territory of Washington, both within the Federal Government of the United States, and again further north the British colonies of Vancouver's Island and British Columbia. The latter name was first conferred by an Act of Parliament in 1858, and until then the new colonies had formed part of the territory, exclusively occupied by the Hudson's Bay Fur Company, while ancient Spanish documents describe the whole territory vaguely and generally as the coast of California. In Oregon gold had been found to a small extent, and partially worked nearly contemporaneously with the first gold-washings in Alta-California. The first actual findings of the metal in Oregon are obscure, and not especially important, since they are in fact but extensions of the Californian gold mines. To British Columbia, including Queen Charlotte's Island, the same remarks are almost equally applicable. The following account of the first official communication on the subject to the British Government is extracted from a popular source. "Gold had been discovered in Queen Charlotte's Island in 1850, but only in small quantities; and it has been long well understood that this precious metal existed not only on Frazer River, but throughout the Central Cascade Range in this direction. As matter of actual discovery, Captain McClelland, in 1853, while surveying the military road from Fort Walla Walla, on the Columbia River, to Fort Steilacoom, on Puget Sound, through the Nachess Pass, found gold in considerable quantities, his men making two dollars a day, sometimes, with a pan. The discovery, whenever or wherever first made, was not reported to the Home Government until June 1856, when Mr Douglas, who so ably occupied the double position of Governor of Vancouver Island and Chief Factor of the Hudson's Bay Company in that region, and who has now been fitly appointed Governor of the new colony, addressed the following despatch to Mr Labouchere, then Colonial Secretary, furnishing, at the same time, the same information to the Secretary of the Company."

The despatch is dated at Victoria, the principal seaport at Vancouver's Island, on the 16th April, 1856.

"I hasten to communicate, for the information of her Majesty's Government, a discovery of much importance, made known to me by Mr Angus M'Donald, clerk in charge of Fort Colville, one of the Hudson's Bay Company's trading posts on the Upper Columbia district.

"That gentleman reports, in a letter dated on the 1st of March last, that gold has been found in considerable quantities within the British territory on the Upper Columbia, and that he is moreover of opinion that valuable deposits of gold will be found in many other parts of that country. He also states that the *daily earnings* of persons then employed in digging gold were ranging from 2*l.* to 8*l.* for each man. Such is the substance of his report on that subject; and I have requested him to continue his communication in respect to any further discoveries made.

"I do not know if her Majesty's Government will consider it expedient to raise a revenue in that quarter by taxing all persons engaged in gold-digging, but I may remark, that it will be impossible to levy such a tax without the aid of a military force; and the expense in that case would probably exceed the income derived from the mines.

"I will not fail to keep you well informed in respect to the extent and value of the gold discoveries made; and circumstances will probably be the best indication of the course which it may be expedient to take—that is, in respect to imposing a tax, or leaving the field free and open to any persons who may choose to dig for gold.

"Several interesting experiments in gold-washing have been lately made in this colony, with a degree of success that will no doubt lead to further attempts for the discovery of the precious metal. The quantity of gold found is sufficient to prove the existence of the metal, and the parties engaged in the enterprise entertain sanguine hopes of discovering rich and productive beds."

On May 8th, 1858, Mr Douglas writes:—"The merchants and other business classes of Victoria are rejoicing in the advent of so large a body of people in the colony, and are strongly in favour of making this port a stopping point between San Francisco and the gold mines, converting the latter, as it were, into a feeder and dependency of this colony.

"Victoria would thus become a depot and centre of trade for the gold districts, and the natural consequence would be an immediate increase in the wealth and population of the colony."

APPENDIX B.

THE GOLD FIELDS OF THE RUSSIAN EMPIRE.

These may be considered as consisting of three principal groups, firstly, those of the Ural mountains; secondly, those of the Altai Chain in Central Asia; and thirdly, those of Eastern Siberia and the tributaries of the Amour River. The gold deposits of the Ural are characterised by their accompanying platiniferous deposits. Platinum, it is to be observed, has never been profitably extracted from veinstones, and even the auriferous veinstones of Russia seem to be of unusual poverty, since there exists but one (near Berezof) which continues to be systematically mined for gold. The extreme scarcity, if not the entire absence, of platinum in veinstones and the paucity of gold in veinstones in Russia alike seem to indicate the similar origin of the two metals. The large area of horizontally deposited gold-beds in Russia, covered only with comparatively recent alluvia, suggested to Sir Roderick Murchison the recent origin of the metal, since not a particle of gold that he could discover had ever been found there in the primeval deposits over an area larger than the rest of Europe; so that in the Russian Empire, at least, it would appear to be especially improbable that sub-alluvial gold has been originated by the abrasion of gold-bearing quartz veinstones.

The exploring expeditions to search for gold by practical diggers whose experience is solely local appear in Russia to be as unsatisfactory as the explorations elsewhere of men of science who, being usually utterly without experience in gold-mining, trust only to specious abstractions. The following account is given by Francis Von Kobell, of Munich: "The hope of finding rich beds of auriferous sands gives rise to a continual despatch of expeditions, which sometimes have to contend with great hardships, and in very many instances return home poorer than they set out. Thus in the years 1841 and 1842, 350 expeditions were sent out in the department of Jeneseisk into the Taigas, as the dark forests covering the flat plains are called, and not one of them met with a single bed of auriferous sand. When one is discovered, notice must be given to the Government, and then the finder receives the right to work it for twelve years under certain conditions."

APPENDIX C.

AURIFEROUS INDICATIONS IN INDIA.

(*Continued from Page 244.*) *By the Rev. Mr Clarke, Jan.* **1853,** *on an Abstract of Lieutenant Aytoun's Geological Report on the Belgaum Collectorate.*

The district to be described is the area included between the rivers Kistna and Mulpurba on the north, south, and east, and a line drawn through Gulguleh, Kulludghee, and Badamee on the west.

Mr Aytoun points out that "the sandstones, schists, and limestone of this formation are so altered by igneous agency" that it is probable granite, which appears at the boundary, north and south, underlies the whole at no great depth.

Sandstone and conglomerate, in parallel ranges, extend so far south as Kuttergeeree (sixteen miles south of Kulludghee), having a strike and trend from W.N.W. to E.S.E.; the valleys being filled up with detrital black cotton soil. The rocks are dislocated at right angles to the strike, and are connected with some remarkable phenomena; such as narrow gorges or gaps; river channels, directed in normal and transverse lines, according to the strike; and an exposed surface of disturbed and altered rocks in the nullahs. "The strata are deflected at right angles to their usual strike; the schistose rocks are often in a fragmentary state, forming a breccia; and the limestones are so indurated and silicified as to strike fire with steel. These phenomena are the effects of an igneous agent acting at a period subsequent to that which elevated the rocks and impressed them with their W.N.W. strike." [In the neighbourhood of the Peel River in New South Wales there are many examples of these identical phenomena.] Mr Aytoun thinks the agents of these disturbances are underground dykes of the basalt which has formed so great an overflow in the Ghauts. He mentions a breccia of limestone and red schist in a base of calcspar near Bagulkot, where it passes into rhombohedral calcspar rock, running N.E. by N. He believes it to be produced by some "electro-galvanic" process.

At Kalludghee, there is a breccia of quartz sandstone in a calcareo-argillaceous base; the fragments are prismatic, the divisions occasionally not more than an inch across; wells thirty feet deep were made in this breccia. These fragments of altered sandstone completely conceal the rocks below. [Similar prisms of altered sandstone cover hills of the far interior of Australia, and such were found by Sir T. L. Mitchell on the ranges near the Darling.] . . . .

Sandstone composes the south part of the district, having the normal strike W.N.W., except where deflected by trap, as at Moorgoor. The precipitous front, towards the black plain of Mulpurba, has an elevation of from 250 to 300 feet; granite appears at the base, and gneiss and felspathic rocks cross the plain to the foot of the Kupputgood Hills. The same sandstone re-appears in the Concan at Acre, Malwun, and Motee, ten miles north of Vingorla. Mr Aytoun, adopting Elie de Beaumont's views, considers it to belong to his Pyreneo-Apennine system.

[This applies to the period of elevation only; but as M. de Beaumont's system is only a theory, too much stress ought not to be laid upon it.]

Iron ore is described as extremely abundant in the sandstone districts; and associated with the iron there are ores of manganese, and abundance of titaniferous iron; and in the limestone near Kulludghee there are traces of copper; at Bagulhot, manganese is also found in the limestone, but more abundantly in the quartz veins of the sandstone. [This association of ores is not uncommon in some auriferous regions.] The iron is sometimes specular, more frequently hematitic and argillaceous.

Iron has at one time been smelted very generally throughout the Talook, and the slag from the old furnaces may still be observed in different localities. The scarcity of firewood in the northern parts of the district, and the introduction of English iron, have been the causes of the extinction of this manufacture. A few furnaces still exist in the southern part of the district, where there is more jungle on the hills. The ore selected for smelting is a poor iron clay, and the iron produced is inferior. Laterite abounds in the vicinity of the iron ores, and follows the law of the other rocks of the district. [It is a ferruginous clay, which extends right through India, and into Ceylon, where it is called *Kabuk*. It is older than *Kunker*, but younger than most of the trap] Diluvian action has spread its detritus, which is covered by the black soil of the valleys. It is sometimes concreted into a compact mass. . . . . .

One passage of this part of the report must be quoted entire, relating to Bagulkot:—

"In a well I observed a section showing a breccia of schistose clay and fragments of quartz sandstone; and this breccia probably constitutes the greater portion of this ridge; but at its western extremity it shows large blocks, *in situ*, of a very beautiful rock. Some of the blocks are entirely composed of brilliant crystals of quartz and hematite; other blocks are found to be a breccia of angular fragments of sandstone cemented with hematite, and this latter sometimes so predominates as to produce large blocks of iron ore. Crystals of quartz are imbedded in the body of the hematite in a singular manner. I believe that in a rock having these characters, and occupying the same geological position, *diamonds and several other gems are occasionally met with in the diamond districts of the south of India.*"

A bed of conglomerate Kunker at one point covered the calcspar, "not the nodular variety which is so common in the black soil, but *sheet Kunker*, which is met with in a great many parts of the Southern Mahratta country, and which appears to have been deposited immediately anterior to the formation of the black soil. In a cavity in the calcspar there were rolled pebbles, and diluvian action was otherwise apparent in the denudation of the calcspar, and in rolled pebbles in the lower part of the alluvial soil." [The black soil mentioned here and elsewhere in Mr Aytoun's Report, and which is alluded to before as probably common in New South Wales, is called *Regur*. The *Kunker* is a nodular concretionary impure carbonate of lime, precisely the same in character and distribution as the so-called tufa nodules and travertin spread in all the Australian *Regur* on Darling Downs, the Liverpool Plains, the Hunter, and everywhere, in short, where the black soil, supposed to be derived from decomposed trap, is common. The locality nearest to Sydney where the *Kunker* may be seen, is on the flat ground between Prospect Hill and the high road from Paramatta to Penrith, especially in the banks of the little creek which crosses the road not far from the Fox on the Hill.] . . .

APPENDIX D.

AURAGEOLOGY OF NEW SOUTH WALES, VICTORIA, QUEENSLAND, TASMANIA, AND NEW ZEALAND.

I.—NEW SOUTH WALES.

Soon after the first information had been imparted by Mr Hargraves to the local Government, respecting the existence of gold in alluvial deposits in New South Wales, Mr Stutchbury, being then the duly appointed Adviser of the Crown in geological matters, was, by official direction, placed in communication with him, and requested to examine the alleged gold-fields, when he, of course, immediately confirmed their existence on visiting the localities pointed out to him. A series of reports upon every part of the colony, the result of explorations undertaken by himself, and by the Rev. W. B. Clarke (whose geological *forte* in his previous communications with the Government had been "the coal measures") followed the new discovery. These documents are exceedingly numerous, technical, and voluminous. The annexed selections from them are the most interesting, both in a popular, and in a theoretical sense, that my space will admit to be now republished. The northern and southern districts were chiefly explored by the Rev. Mr Clarke, and the western districts by Mr Stutchbury. The extracts from Mr Stutchbury's reports relate to the neighbourhood of Wellington, and include the *locale* of the quartz-vein whence the shepherd Macgregor procured his gold. These quotations will afford a fair specimen of his geological records, except of those which are only of interest in Palæontology. A short report from Mr Hargraves is also introduced. The Victoria gold-fields remained a longer time without official exploration, in fact, the gold deposits in that colony had been thoroughly opened before the official employment of any professed Geologist by the local Government, when at length Mr Selwyn, who had been despatched from England, arrived for the appointment. His first official report on the Victoria gold-fields is also reproduced amongst the following papers. The earliest mention of the gold discovery in any official despatch from Australia to England, occurs in one addressed to Earl Grey, by Govenor Sir Charles FitzRoy; it is dated on the 22nd of May, 1851. The annexed communication of Mr J. R. Hardy, the newly-appointed Chief Gold Commissioner, is amongst the earliest descriptive and speculative accounts of the first-found gold-fields, and from them it appears that the total absence of any considerable quartz-veins, and the small-sized gold on the Turon River, compared with the contrary conditions on Summerhill Creek, were important points especially noticed and commented upon by this official authority, accompanied, however, with the theoretical fallacy, that *ergo* it is a plain deduction, that the large gold detached from its matrix of quartz (as he affirms) must be at the sources of the Turon River. The Rev. Mr Clarke's reports altogether abound in speculative inquiry; but still his accurate geological descriptions sufficiently refute the theory of Sir Roderick Murchison, while his continual reference of the phenomena of placer deposit gold to a dispersion of the metal from destroyed quartz-veins, and from a supposed granite matrix, may rather be attributed to the circumstance of a more complete theory not having occurred to him during his then brief experience, than regarded as an expression of his final judgment. The physical conditions described in his geological researches, are perfectly reconcilable with the theory set forth in this volume.

The observations of Surveyor-General Sir Thomas Mitchell after a very limited personal experience of the subject are especially deserving of notice. His theoretical views of the formation of quartz veins are perfectly compatible with that of an igneous overflow; it is indeed, as he observes in his report upon the neighbourhood of Mr Hargraves's discovery, "a most uncommon circumstance to find gold in the quartz veins," and I believe he found in them no gold whatever. One conclusion of Sir Thomas Mitchell, though logical in itself, upon the premises which he then possessed, is, nevertheless, not warranted by the fact in nature; and this negative fact induces the necessity of having to assume a third hypothetical and perishable liquid agent to account for it, and to convey gold from the fissures which are now quartz-veins. The erroneous conclusion referred to, and which experience does not confirm, is the conjecture that, " the nearer the quartz is found to the igneous rock and place of eruption, the greater will be the probability that so heavy a metal as gold may be found with it."

The Crown rights to gold were first proclaimed in the colony under date of the 22nd May, 1851, as follows:—" Whereas by Law all Mines of Gold, and all Gold in its natural place of deposit within the Territory of New South Wales, whether on the Lands of the Queen or of any of Her Majesty's subjects, belong to the Crown: and whereas information has been received by the Government that Gold exists upon and in the soil of the County of Bathurst, and elsewhere within the said Territory, and that many persons have commenced, or are about to commence, searching and digging for the same, for their own use, without leave or other authority from Her Majesty: Now I, Sir Charles Augustus Fitz Roy, the Governor, on behalf of Her Majesty, do hereby publicly notify and declare that all persons who shall take from any Lands within the said Territory any Gold Metal, or Ore containing Gold, or who within any of the Waste Lands which have not yet been alienated by the Crown shall dig for and disturb the soil in search of such Gold Metal or Ore, without having been duly authorised in that behalf by her

Majesty's Colonial Government, will be prosecuted, both criminally and civilly, as the law allows. And I further notify and declare that such regulations as upon further information may be found expedient, will be speedily prepared and published, setting forth the terms on which Licenses will be issued for this purpose, on the payment of a reasonable fee."

The localities of certain gold-fields in New South Wales were officially proclaimed as follows in the Government Gazette of the 2nd February, 1853, a short time after the Imperial Government had transferred the control of the management and revenue of the gold-fields from the Local Executive to the Local Legislative Council In this publication the Peel River, Bingera, Wellington, and Braidwood are included, but not Goodgood or any of the neighbouring streams on the Western watershed.

Proclamation by his Excellency Sir CHARLES AUGUSTUS FITZ ROY, Knight, &c.

In pursuance of the power vested in me in this behalf, I, Sir Charles Augustus Fitz Roy, the Governor-General, do hereby proclaim that the following shall be deemed to be gold-fields within the meaning and for the purposes of the Act of Council 16th Vict., No. 43, intituled "An Act for regulating the management of the Gold Fields of New South Wales, and for raising a revenue therefrom, and for the preservation of order thereon," that is to say:—

1. The gold-fields on Crown lands at and in the vicinity of the Macquarie River with all its tributaries (from its source to Wellington), including the Cudgegong River, the Meroo Creek, Louisa Creek, the Pyramul Creek, the Turon River, Winburndale Rivulet, Campbell's River, Lewis Ponds' Creek, Frederick's Valley Creek, the Muckerwa Creek, and the Bell River; together with Mitchell's Creek.

2. The gold-fields on Crown lands, at and in the vicinity of the Abercrombie River and its tributaries (from its source to the Lachlan), including Tuena Creek.
   The Araluen Creek and its tributaries, including Bell's Creek, and Major's Creek.
   The Mongarlowe River and its tributaries, to its confluence with the Shoalhaven.

3. The gold-fields on Crown lands, at and in the vicinity of the Peel River, with its tributaries (from its source to its confluence with Ogunbil Creek), including Oakenville Creek, Hanging Rock Creek, and Oakey Creek, together with the sources of the Barnard, as far down as Mount Woolombland.
   Bingera Creek and Coorangoorah Creek (from their sources to their confluences with the Gwydir River), together with the intervening portion of that river.
   The Rocky River, with its tributaries from Kentucky Creek to the confluence of Boorolong Creek.

Before the more systematic and scientific explorations of the Rev. Mr Clarke and Mr Stuchbury were undertaken at the public charge, the three following papers, all eminently theoretical, appeared in the public prints, each writer being then an official personage, and therefore regarded as a reliable authority on the subject.

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1. From the First Report of J. R. Hardy, Esq., Chief Gold Commissioner on the Turon River and Summer Hill Creek (1851).

"The Turon gold-field is of the most satisfactory nature, and places the settled and profitable nature of gold-digging beyond question.

"The geological nature of the Turon country, its physical conformation, and the description of gold found there, are all totally different from the same at Summer Hill Creek. Summer Hill Creek is narrow, confined between high ranges, with a fall so great as to make the rush of water in time of flood immensely great; and you cannot ride one hundred yards along the stream, so broken and narrow and difficult is the watercourse; and the hills are mica-slate, intersected in every direction with broad and well-defined quartz-veins. On the other hand, the Turon river runs through a valley of some miles in width; that is to say, the wall of ranges that bounds one side is some miles distant from the wall of ranges that bounds it on the other, though there are plenty of intermediate ranges breaking up the general run of the valley.

"Then the Turon hills are twice the height of Summer Hill ditto. They are formed of mica-slate (without much mica), and no quartz-veins whatever. I walked nine miles down the river and back, and, with the exception of slight and ill-defined indications, saw no quartz-veins. As might be expected, therefore, from the width of the valley, the bed of the Turon is broad, level, not tortuous, compared with Summer Hill Creek, presenting few of those abrupt elbows so frequent in the former. In short, that river rolls on in time of flood (which rises about twelve feet) in a comparatively uninterrupted stream, over a smooth bed, along which for miles, when the water is low, as at present, drays can travel with great ease.

"In Summer Hill Creek the gold is always large in the grain, often massive, seldom thin and scaly. At the Turon the gold for the nine miles I have carefully investigated is precisely the gold enclosed. Then the Summer Hill Creek has its barren straight reaches and its profitable slopes; whereas in the whole course of the Turon (for the nine miles I have mentioned) the production of gold appears to be as regular as wheat in a sown field. No sloping elbows; no narrow long gorges. I found several parties whom I knew at Summer Hill at work several miles apart on the Turon. They had tried up and down (for that nine miles and a few miles further down) in hopes of getting into the coarse gold of Summer Hill, but the result was always the same. It does not matter where, in the bed of the creek or the impending banks, you work, any steady working man can earn ten shillings a-day with the utmost regularity. . . . I wish to call your attention to another plain deduction from the facts I have stated. In Summer Hill Creek, with its numerous quartz veins, and its broken bed and narrow tortuous course, giving rise to eddies and their results in slopes and precipices, the gold is massive in its general character; the dust of that quarter being exceedingly coarse compared with the Turon. In the Turon nine miles, with its regular, wide, unbroken bed and banks, its straighter course and its absence of quartz-veins, the gold is exceedingly fine. I most confidently believe that the said Turon gold is the production chiefly of the upper and unexplored and broken sources of the Turon: that there, too, will be found the narrower steeper country and the multitudinous quartz-veins; there, too, the coarse gold detached from its neighbouring matrix, too heavy to be carried with the lighter particles with every flood towards the Macquarie."

2. From a Paper by the Rev. Mr CLARKE, 'On the Sources of Gold.' First printed in Sydney 29th May, 1851, and since presented to the Imperial Parliament by Command of her Majesty.

The notion entertained by some persons who profess geological principles, that gold is still forming, is without a shadow of evidence, and totally contradictory to everything that has been ascertained on the subject. Such a notion can only be entertained by those whose experience is limited or whose inquiries have just commenced, and who have not had sufficient acquaintance with field geology to be able to read off the testimony of nature.

With respect to the sources of gold, they are twofold. The metal either occurs diffused in certain rocks, or has been spread over the surface of the hills and their bases by the violent action of water, which, at a former period in the earth's history, has broken up and dispersed the fragmentary ruins of the upper beds of rock over the surface of the flatter regions below.

With regard to the original source of the gold in the alluvia, it may be said generally that, contrary to the usual law which obtains in the history of metals, it is only the upper and not the lower portions of veins that are prolific; and therefore one argument insisted upon by some persons, that it is necessary to have very high mountains to expect much gold is not sustained, either by general experience or the actual facts that have been exhibited in the Ural.

3. From an Official Report of Surveyor-General Sir THOS. L. MITCHELL, 'On the Gold Fields of Bathurst and Wellington, New South Wales.' 16th October, 1851.

Quartz rock has been called the matrix of gold, but as the natural history of gold seems still very little known, it behoves us to be very cautious in adopting anything without very satisfactory proofs. It is, however, known that silica is one of six substances mainly composing the crust of the earth, and, in a crystalline form, it is called quartz. "That silica and its associated bases, which are oxidised at the surface of the earth and thus deprived of their elementary activity, exist at a moderate distance beneath the surface devoid of oxygen, in the state of simple combustibles, there is little reason to doubt." From this passage, which I (Sir T. Mitchell) quote from Dr Ure, it may be inferred that the nearer the quartz is found to the igneous rock and place of irruption the greater will be the probability that so heavy a metal as gold, or indeed any other metal, may be found with it.

That gold is found chiefly where quartz-rock occurs, and that this quartz is most abundant in the schist, which is the predominant rock of the country between the Canobolas and Wellington Valley, is soon ascertained; but to find gold in the quartz is a most uncommon circumstance.

The subject of the occurrence of the metals in veins and masses is obscure, but the general fact that they are most abundantly situated near the junction of the stratified and unstratified rocks, indicates their connection with an igneous cause; and in common with other veins, the two principles of simple injection and chemical segregation have doubtless operated in their production.

GEOLOGICAL SURVEYS OF THE SOUTHERN DISTRICTS OF NEW SOUTH WALES.

MAJOR'S CREEK AND ARALUEN GOLD-DIGGINGS.

1.—Extract from a Letter by the Rev. W. B. Clarke, to the Colonial Secretary.

Jineroo, 21st October, 1851.

Sir,—In my last despatch I stated that it was my intention to examine the Gourock Range and the Curwary Country. I have now the honour of reporting to you, for the information of his Excellency the Governor-General, the accomplishment of that object.

• • • • •

Mr Hargraves is now about to follow this ravine, and to travel to Wondilla, I hope with success, as I have information from a different source that gold in small quantities has been found in that locality. The granite of the Araluen ranges is in that direction, succeeded by slate and schistose quartzes, as I discovered on a former occasion, when I followed out the edge of the granite to the south eastward.

The gold, however, as will appear shortly, is in this part of the country not so much connected with the schists as with the granitic rocks; and to the relations of the latter with that metal, and the other (igneous) formations, I now beg leave to call your attention.

• • • • •

As in other granites of the epoch to which I am inclined to refer it, there are all kinds of transitions of composition—into ternary granite of various proportions, and into binary compounds of quartz and felspar, felspar and mica, mica and quartz, quartz and hornblende. Patches of true felspar porphyry, of large composition, occur under the form of dykes, the joints altering at the planes of contact of the varieties, and the apparent dykes assuming a transversal cleavage. But not unfrequently this appearance of intrusive dykes is imaginary. Followed out and carefully examined, these apparent dykes and veins are often found to be mere segregations of the crystalline materials of the rock of a smaller size; there are thus passages of indefinite variety from true granite into syenite, porphyry, and compact felspar, as well as into hornblendic rock. The absence of mica and the occasional presence of talc, in small crystals, reduces the granite to the form of "talcose rock," which in America is a matrix of gold.

I can therefore quite understand how gold may be discovered in a rock made up of granitic material, whether under the ternary, quaternary, or binary form, provided the materials be such as are known to be prevalent in gold-bearing rocks elsewhere.

Passing to the eastern side of the Shoalhaven Basin, we have the same phenomena developed in the Araluen ranges, only on a wider area. I came to some of the conclusions to which I have alluded above in the study of the apparent dykes and veins that there occur, and I found that what might have been taken for intrusive dykes of porphyry, for instance, were merely bands of segregation, in which felspar and the finer materials of the other minerals were predominant. It was in endeavouring to comprehend the occurrence of gold in such rocks that I was led to re-consider a question which had often occupied my thoughts, without reference to that metal; and I am now convinced that there is nothing surprising in that occurrence of gold in such rocks as those which I have described as the granitic rocks of the Shoalhaven basin, nor in the deposition of micaceous sandstone, derived from quartz and mica, at an early period, upon the granite of which they came, and which was afterwards to be thrust upwards through such deposits, the latter becoming hardened in the process.

It was with a view to study the point again that I deemed it advisable to proceed to the Major's Creek, which I yesterday examined.

After leaving the porphyry of the Bendoura range, I came upon a rock which might be called a pegmatitic porphyry, and then to a hornblendic and micaceous variety of it, a passage at last being effected into true hornblendic granite. I have no doubt whatever that the rocks in this transition were metamorphic or transmuted, a mixture of the granite and the porphyry. But when I had advanced into the creek, to the point beyond which there is no further progress, I found the bar to be formed of a hardened unmicaceous porphyritic rock, which passed like a dyke of intrusion across the valley, and formed the top of a lofty waterfall into the lower part of the creek. The only change which I noticed in the granite near it, was that it was in a state of disintegration; and in this disintegrated soft granitic detritus, or rather granitic materials disintegrated in situ, gold is in great abundance.

Whatever, therefore, may have been the cause why the granitic materials have undergone this alteration, it is not evident that the more porphyritic unmicaceous rock effected it, for that is not in a condition to disintegrate. The hornblendic rock is that which when micaceous readily decays; the hornblendic unmicaceous rock seems less ready to decay; but both are in some degree auriferous,—yet I saw no instance of an auriferous rock which was not hornblendic. I therefore was led to a further conviction of a view before taken, that the gold hereabouts is connected with the presence of hornblende, and is therefore not anomalous, as supposed by some persons. The quartz is less developed in many parts of the gold-bearing detritus than in other localities where quartz seems the chief matrix. But in the true quartz porphyry, issuing at the base of the granitic ranges, I can discover no traces of gold, though yesterday I again found it by washing the bed of a creek running over porphyry; and I remark further, that, though I have also found gold in the Shoalhaven higher up than here, it seems to me that it is absent where not in the vicinity of granitic rock containing hornblende. Mica, therefore, and felspar, are not necessarily connected with gold, but I think hornblende and quartz must be so, either alone or together.

The bearing of this deduction will be evident if we recollect that granite such as that described is not confined in this colony to Araluen; and I therefore should expect to find gold in localities where such a rock exists, bearing in mind other physical conditions, though at a distance. Indeed, in this district we have seen how one opening has succeeded another, and I now learn that in Jillimatong Creek gold has been found. Calling to remembrance the phenomena in the Vale of Clywdd, I recollect that gold was found near Hartley, where disintegrated granite of a similar character exists, and that that granite becomes syenitic and porphyritic, and is traversed by trap.

It is not improbable, therefore, that gold will be found in other localities not now declared; and although I am still of opinion that the extent of ground occupied by gold-washers in the Araluen creeks is limited, and must therefore produce a limited supply, yet the abundance which I saw myself in most parts of the Major's Creek has convinced me that for a few months to come the people occupied therein will be well remunerated. I carefully inspected all the operations going on, and saw several persons with considerable gains.

On entering the creek, which is in appearance in no way different at its head and in its lateral branches from thousands of low valleys in granitic regions all over the colony, being a mere watercourse draining smooth grassy downs, I saw a spot marked by the presence of ironstone; and on prospecting, gold was readily found. This ironstone is evidently an argillaceous ore, derived probably from the iron in disintegrated hornblende, and through it there run small veins of quartz, which may have resulted from the quartz in the granite in the same way. The presence of ironstone in this way in auriferous localities is not a local but apparently a widely existing phenomenon. The occurrence of auriferous ironstone in the limestone of the gullies near Marulan—in the limestone of Wianbene—and as I learn from a specimen brought by Mr Hargraves from the vicinity of limestone near Jingery, is not without its significance. It extends our views of the gold question. As the gold in the Major's Creek was first made known by a prospecting woman, whom I saw there yesterday, on the 5th October, and is now remunerating nearly four hundred persons within the limit of a mile, it is uncertain to what extent the metal may be yet discovered. . . . . .

In order to enable you to realise my reference to the gold-bearing rock, I forward by this mail a small packet containing a few particles of gold, which were procured by washing a piece of partly disintegrated rock, the fragments of which are also forwarded, taken from a hole dug in the bell of Major's Creek, by Mr Boyds, of Balalaba. A piece of the same rock in which I recognised gold (not disintegrated) is also enclosed.

Besides these I picked up from a small opening in the bank of the Creek, at a cradle which had produced two ounces of gold before noon yesterday, another fragment in which the gold was prominently sticking out from it; and I found persons carrying soil from the top of the bank at the lowest accessible point down to the creek to be washed, as it was found to be abundant in gold. The whole bank on the opposite side was said also to be full of it. I have, &c.,

(Signed) W. B. Clarke.

The Honourable the Colonial Secretary.

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2. Extracts from a Letter by the Rev. W. B. Clarke to the Colonial Secretary of New South Wales on the Geology of the County of Wellesley, with Remarks upon *Maneroo* generally and the Relations of Auriferous Rocks.—6th March, 1852.

It is not improbable that, as the trappean rocks have burst through and transmuted the schistose formation, and also hardened the regenerated fragments of it, certain members of the trappean rocks (being of different epochs) may have produced the whole of the quartzose impregnations.

If, as I believe, the different eruptions of trap may have continued to a much later period than those alluded to, it is not improbable that the same origin which produced the barren quartz dykes may have produced those which have been found prolific in gold; and as we find granitic rocks which produce that metal to be in intimate association with certain kinds of trap, we shall discover in the above disquisition a bearing upon the question as to the origin of gold, and of its apparent capricious occurrence in quartz, granite, ironstone, and conglomerate of *apparently* various epochs.

The question as to the age of its alluvial deposition is of a totally different kind, and is by no means prejudiced by the above remarks. I will only add, that the occurrence of peculiar trap, charging the fissures of the rocks with silica dissolved in steam (the cooling condensation of which I believe to be the true origin of quartz veins), may have produced auriferous impregnations as well as siliceous; and thus where the silex was not in combination with gold, no gold can be found, though quartz dykes and veins abound. Similar remarks apply to the occurrence of hornblende in association with granitic eruptions, and to ironstones resulting or not from the iron in combination with hornblende or other minerals.

The apparent capriciousness of the distribution of gold in matrix may, therefore, result altogether from causes easy to comprehend, but still very difficult to illustrate by positive testimony. The whole question depends upon a more perfect knowledge than we at present possess of the natural history of trappean eruptions.

That gold does not always occur in quartz-veins of the same age, nor in all kinds of granite of one age, is a fact now unanswerably demonstrated by, in part, my present researches. Why it should thus occur, I am, at present, unwilling to attempt to declare. It is, however, one step in the inquiry, to have shown the possible variations of its occurrence, and the relationship of those rocks in which, under any circumstances, it has been found.

As concluding my remarks upon the general geological phenomena of the district more especially under review, but which are applicable to other portions of the Maneroo and of the colony at large (where formations of similar ages occur), I think it right to mention, that I have found no traces of what is called "foreign drift." The detritus is all local, oftentimes over the rocks whence it has been derived, and more frequently this detritus consists of clean, unabraded, or very slightly rounded fragments of quartz, slate, grit, granite, &c., except in river beds where violent waters produce considerable friction. The unabraded fragments are portions of rock, divided by joints, which have been snapped off by the expansion under heat of the moisture deposited in the fissures from dew, rain, or snow, and also from the effect of frost. The rains carry down the lighter detritus to the creeks, where the softer slates become disintegrated, and the harder rocky fragments assume the usual character of fluviatile drift.

3. GOLD ON SLATES.—Extract from Letter of the Rev. W. B. CLARKE to the COLONIAL SECRETARY on the Auriferous Character of Maneroo.—22nd March, 1852.

Hitherto I have seen nothing of gold in this southern country which I could not satisfactorily attribute to the influence and existence of granite. Here the prevalent rocks are of the slate formation; and from what I have seen, and the examination I have made of the gold itself, I am persuaded that it is local, and derived from the ferruginous quartz-veins which traverse the slates and associated grits.

There is no doubt that it occurs in a green soft muddy slate (looking blue when wet), which decomposes into a greenish mud of the same tint, but not of the same component parts, as that which supplies gold in Major's Creek, Araluen;—I washed it myself from that rock.

On one specimen in my possession, and which weighs fifteen grains, I observe one side to be marked distinctly by the minute points of quartz and the laminæ of a fine grit, and on the other side the gold folds over and entangles several minute pieces of quartz. All the gold that I have seen, included in two or three ounces, is of the same character; it has rugged distinct protuberances, produced probably by its original insertion in cellular quartz, or it has sides exhibiting a delicate roughness as if having been in contact with a plane uneven surface.

. . . .

The only fact which I now wish to dwell upon briefly is, that this prevalence of gold so far to the southward must, in connection with the occurrence of it in numerous other localities in which I have reported its existence, satisfy the public that I did not overrate its probable occurrence as co-extensive with the colony, when long ago I encouraged the search for it elsewhere than in the basin of the Macquarie.

It is an astounding fact, and one which I am gratified to have been able to demonstrate, that (taking into account other localities in which I know it to exist beyond, though near to, the limits of the Maneroo district) gold is distributed, though in variable quantities, and of small commercial importance, over a region which may be said to embrace an area of 16,000 square miles. In this area I include no portion of the country northward of the parallel of Marulan; and I also except the counties of St Vincent, Dampier, and Auckland; but I have included the trap country dividing the basins of the Murrumbidgee and the Snowy Rivers, because I found gold at the junction of the trap and the slates at one spot, and there are geological data to induce the conclusion that the slate formation extends under the overflowed trappean country; and as similar granites to those in which I found gold elsewhere have been also traced, where my time did not admit of direct search for the metal, I think the area defined might be safely extended. I had the honour of forwarding to his Excellency the Governor-General, in August last, a fine sample of gold from Yass River, and I have since had the honour of reporting the existence of gold in the neighbourhood of Tarcutta, in the copy of a letter from a gentleman who found it there, in reliance upon my authority that it there exists.

I can therefore have no hesitation in declaring the whole of the vast region above defined to be, more or less, auriferous.

GEOLOGICAL SURVEYS OF THE NORTHERN DISTRICTS OF NEW SOUTH WALES.

HANGING ROCK DIGGINGS.—HYPOTHESIS OF THE FORMATION OF GOLD BENEATH THE SEA.

4. Extract from a Letter by the Rev. W. B. CLARKE to the Hon. the COLONIAL SECRETARY, on the Geological Character and probable Extent of the Hanging Rock Diggings, and on the continuation of the Gold-fields to the Northward.

Camp, Peel River, 15th November, 1852.

SIR,—I do myself the honour of reporting, for the information of his Excellency the Governor-General, that since I last addressed you, on 6th November, I have been occupied in making a careful inspection of the Creeks comprehended in what are called "the Hanging Rock Diggings;" in revisiting the works on the Peel River; in calculating the heights of the principal features in these districts; and in endeavouring to obtain a comprehensive view of the peculiar geological conditions under which the auriferous rocks and deposits of the various localities have been formed. . . . .

Immediately at the base of the Hanging Rock issued abundant trappean eruptions, in the form of the basalt, amygdaloid, serpentine, and diorite, with numerous veins of quartz, many of them auriferous, or filled with auriferous pyrites, or other varieties of the sulphuret of iron; and these veins appear to be charged with gold, chiefly when they run in an *east and west direction*, or within a degree or two of that bearing.

On the high grounds around the Hanging Rock, the numbers of the plant-bearing beds, viz.:—shales, grits, and conglomerates—rest in confusion, or cover with their fragments all the slope; assisting in filling up the lower portions of the creeks with innumerable pebbles, which are mingled with the rounded masses of traps and the clays derivable from the serpentine, that now, in their removal, give great trouble to the gold-washers.

Having followed up Hookanvil Creek to its rise, and visited all the minor creeks at its head, as well as Oakey Creek, I have seen that the rocks which I have mentioned are those alone which are found; and I, therefore, assume that the drift is all local. Having also seen that the quartz-veins are traceable at the bottoms of the creeks, where the operations of the gold-washers have exposed them, and having also broken, from veins of quartz, fragments richly laden with gold, I can come to no other conclusion than that the whole of the gold detected in these "diggings" has been derived from such veins, since I can find no trace of it (except in one instance, which was that of a nodule of greenstone) in any other matrix than quartz, and is too unimportant to take much notice of it.

The alluvial gold is then, undoubtedly, due to the previous destruction of such veins, or rather of the upper portions of them, when the rocks, which are traversed by them, once rose to a higher level around the focus of impregnation. Whether that impregnation was contemporaneous with the exhibition of the forces by which the rocks, that are now so much shattered, disturbed, and transmuted, were first attacked by the trappean eruptions, it would be hazardous to say, but, from the investigation which I have made, I find reason to conclude that it is probable the first dispersion of the gold took place under the sea, into which, or near the surface of which, the trap was outpoured. The presence of waters in the dispersion of the superficial detritus—the filling up of the creeks—and the rounding and abrading of the steep walls which border the *fissures* in which these creeks occur (for they are little else), is proved clearly enough by the condition of those creeks and their alluvia. But I find traces, satisfactory to my own mind, of the presence of waters at the time of the formation of the veins, and of some of the trappean rocks in which gold is now found. In what are called "the dry diggings," the chief alluvia are decomposed serpentine and fragments of what some persons persist in describing as "burnt quartz," with some ferruginous clays, which cannot be doubted as derived from a rock containing some lime, some magnesia, and much alumina. The black soil in the hollows, which are often swampy, is, probably, the evidence of the sojourn of atmospheric waters, into which some gold would, necessarily, be washed in heavy rains. The lime which, even at the Hanging Rock, occurs in nodular concretions, just as on the plains of trappean alluvium, all over the colony, and which I have never found wanting in the first flats below a trap hill, is naturally enough accounted for. It is a modern tufa, and has in many instances, as I have seen in the heaps of cradled rubbish picked up, held small particles of gold. It occurs in another form in the lower parts of the creeks, where it encrusts the face of the rocks, and cements the pebbles entangled at every little fall; and this tufa is equally common in one creek as another, occurring wherever water brings down calcareous matter, and which can be subjected to evaporation. The magnesia is, no doubt, derived from the serpentine. The abundance of hornblende in the trap will, probably, account for the great development of ferruginous matter. These minerals, therefore, prove nothing for or against the point which I wish to submit to the consideration of those who take an interest in such studies. . . . . .

It will be gathered, then, that I believe the dispersion of the first gold from the quartz-veins which have been destroyed, took place, probably, under the waters of a shallow ocean. To assume otherwise forces the admission of a terrestrial water supply, for which the mountains do not appear to have furnished a sufficient means. If we imagine a reservoir, which, breaking its bounds, carried all before it, and so spread the gold along existing slopes and the bottoms of excavated creeks, then we must have mountains far higher than any now in existence. But we have seen already that the veins carrying gold still exist, are still prolific, and that the tops of them are the destroyed sources of the drift gold; and yet, in the "dry diggings" at "Hanging Rock," in the decomposed serpentine, the gold is as much water-worn as anywhere else, and these diggings are full 2,200 feet above the gold-washings in the Peel!

There is but one other supposition to explain this phenomenon—viz., that of a long drift passage from a distance, but it is physically impossible that such a case could have happened. The gold would, in that case, have been more widely diffused on the summits and slopes of the mountains, and not so precariously distributed. Far to the southward the main range stands like a high barrier over the basins of the Hunter and other coast rivers, and the only higher ground to the northward is on the narrow table-land of New England, whence the waters flow in the other direction.

Another proof has been found by me, as I believe, of the validity of my opinion.

From an inspection of the produce of a great many claims, both on the Peel and on the creeks flowing to it, I find that there are several varieties (in appearance) of gold in these "diggings;" that the water-worn dark gold retains its character from the highest ground to the lowest, that the largest and most beaten lumps occur high up as well as below, and in greater proportion, and that the bright unbraded gold only occurs close to the occurrence of veins now producing it. In a claim opened by Mr Weller and Lieutenant Birch, a quartz-vein was exposed in the bottom of the Hookanvil Creek. Immediately below was the claim of Messrs Doyle and M'Dougall. I saw in their pan on the 10th instant a considerable amount of water-worn gold, and only one piece of very bright and almost crystallised gold. No doubt, I think, can exist as to the origin of the one in an ancient dispersion from the now-destroyed upper portions of existing veins, and of the other in the recent destruction of the auriferous vein in the claim above. No eye accustomed to observation could be deceived.

I have, then, endeavoured to show that the gold was in part formed under and dispersed by ocean waters, probably at the epoch when, having descended to admit the deposit of the younger carboniferous deposits, the country again rose to the surface, and the rising sea-bottom became exposed to the wear and tear of the waves, which carried off much of the higher portions, disintegrated the serpentine bands into clay, and left the gold in it and below it; and, as suggested, this might have been contemporaneous, or nearly so, with the outbreak of the elevating forces, and the outpouring of the transmuting, disturbing, and fracturing trap, which assisted in the production of silicious impregnations and the accompanying gold.

The appearance of the silicious rock to the eastward is that of chert, or deposit from heated water; and supposing that the sea was just overlying the locality of eruption (and there is little need, perhaps, to suggest that trap rocks were formed under water), it is natural to suppose that the water would boil, and be converted into a highly solvent principle, by the aid of the alkali in the trap whence the felspar was partly derived.

Hence I infer that this cherty rock was formed, as well as the serpentine, in the sea; and I have already in a former report suggested that quartz-veins, as we see them in Australia, were probably formed by the direct agency of steam.

Admitting, then, that this may have been the case, it is likely that the gold itself, found so generally in quartz, may have had a similar origin, for (whether formed under the sea or not) water, in my opinion, must have been present during the formation of such gold.

The common opinion that gold is formed in quartz by the direct agency of melting heat is so contradictory to all I have seen, that I cannot accede to the statement that such is the way in which gold and quartz have been united.

It is quite certain, from such examination as I have been able to make, that the gold, and the quartz containing it, must have been formed at the same time, or by the operation of the same process. And even if, as I have before supposed, some gold has been electrotyped on the surface of quartz-veins, this does not contradict the belief that gold in quartz, crystallised with quartz, and occurring, as it often does, in the cavities of quartz-veins, which are perfectly closed, may have had a contemporaneous origin.

Now, I have always found that when gold-bearing quartz is *fused*, the tendency of the gold is to run into spheroidal or globular shot—a property, I believe, under some circumstances, of other metals also. A specimen of partly-fused quartz, from Mount Alexander, contained gold, when broken, in such spherical forms as I mention; and the whole of the gold originally in the quartz had been thus melted and collected. Similar results have been exhibited to me by persons employed in artificially melting gold rocks. And if we regard the intensity of dry heat sufficient to do what is laid to its charge, the effect of that heat would have been the fusion of the gold out of quartz, and not its retention under the forms which we often find it. And, moreover, gold often occurs in conglomerates cementing the pebbles, and in argillaceous iron ore (a hydrous product), without the slightest sign of heat, such as is supposed. on the pebbles, or the iron.

Admitting, then, that the connection between rocks of igneous origin and the formation of gold is undoubted, that quartz may be considered a matrix of gold, and certain trap rocks the generators, it by no means follows, with all the light we have now on the existence and action of such forces as thermo-electricity, galvanism, magnetism, &c., acting slowly for long periods of time, or rapidly and momentarily, that we are to accept, without a question or a doubt, the commonly declared opinion that when gold is found in quartz it is melted into it, and when gold is not found in cavernous quartz it is melted out of it.

If the geological facts, exhibited at the Hanging Rock, did not necessarily lead me to this discussion, I would not here have introduced it, but the exposition of nature in this locality seems to me to be so instructive, that I would not pass over the opportunity of recording my opinions. . . . .

Looking at the disposition of the waters between this neighbourhood and the head of the Hastings on the one hand, and Bingera on the other, I expect to find that in a northward direction from Cobrabald to the latter gold-field the precious metal will be found generally distributed over a breadth of country perhaps thirty miles wide, because in that area the rocks, so far as I am at present acquainted with them, are frequently such as are in connection with gold. The peculiar arrangement of the creeks falling into the Apsley is precisely that of the creeks falling into the Peel, only in traverse order, and there are other superficial physical dispositions of the country which give to many parts of the area I have named the features of a gold country.

The very circumstances which I have detailed of the geological features of the district will show that here we have only limited areas for alluvial diggings, but in the hands of intelligent men of capital the quartz-veins themselves would produce considerable gains; and it is not improbable that were the ground fairly tried, it might yield some addition.

There is a quartz-vein on the range between the Peel and Duncan's Creek, which is supposed to be rich; it has not been wrought, and the ground near and below it is, I believe, untried. I know of several other veins which are auriferous. There are, however, other systems of veins which traverse the quartzite and jasperoid rocks as well as the metamorphic shales and slates. I found several in the ranges between the Peel and Duncan's Creek, which show that there must have been several periods of silicious impregnation.

Whether my judgment is right or wrong in this respect future research will discover.

I consider it my duty to throw out these preliminary hints, in order to offer encouragement to such as may be disposed to assist in determining whether "The Hanging Rock Diggings" are an exception to a rule, or what I believe them to be—the outskirts of a field of far wider extent. I have, &c., W. B. CLARKE.

The Honourable the Colonial Secretary.

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5. Extract from the Rev. Mr CLARKE'S REPORT to the COLONIAL SECRETARY, expressing his views relative to the dispersion of Gold in Australia.

Peel River, 24th November, 1852.

It will easily occur to a reflecting person that, if gold has been almost universally distributed over the surface of our declivities, there must have been a sufficient cause of dispersion. I have already stated my belief that the gold was in some cases collected, from the rocks that held it, into the hollows in which it is now found in decomposed materials, whilst the localities alluded to were under the ocean. Admitting this, we have still to account for its dispersion along channels now occupied by running waters of feeble power since the elevation of the present dry land above the sea.

I will, however, mention that the amount of evidence, from a collection of observations recorded by the various travellers and navigators in Australasia, is so great in favour of a former much more moist condition of climate than now obtains, that it is impossible to come to any other conclusion than that, in a previous geological epoch, waters which were capable of producing effects such as those shown by the wide-spread local detritus and deeply-accumulated alluvia of the country north-west of the Liverpool Range, and capable of dispersing gold as we now find it dispersed (which the present streams could not have dispersed under any known conditions of the present climate), must have occupied a more extensive area than any internal waters occupy at the present day.

THE ROCKY RIVER GOLD-DIGGINGS.

6. Extracts from a Letter by the Rev. W. B. CLARKE to the Hon. the COLONIAL SECRETARY, on the Geological formation and auriferous character of the country between the heads of the M'Leay and Gwydir Rivers.

Armidale, 14th February, 1853.

SIR,—I do myself the honour of reporting to you, for the information of his Excellency the Governor-General, some account of the formation and auriferous character of the country which I have been occupied in exploring since I addressed you from Walcha.

1. The area in question comprises a section from the falls of the Tiah River, to a few miles north of Boorolong, and embraces the sources of the M'Leay River as far as the Gyra, and the heads of the Gwydir as far as the lowest gold-washings on the Uralla or Rocky River.

In the course of my traverses I have crossed "The Dividing Range" at eight different points within the space occupied by it in that area, exclusive of those before mentioned. I found it composed of granite, and various trappean products, such as basalt, greenstone, porphyritic greenstone, and some porphyry, these having intimate relations with the granite, into which there appears occasionally to be a direct passage, though some of them have also risen through the granite at a later period of eruption, and have produced sensible effects upon the granite itself as well as upon the schistose formations which abut upon the granite towards the south-east and east.

The granite itself, except in one instance, upon the Gyra River, assumes a nodular concretionary structure, decomposing into rounded, smooth, and dome-like masses, or into separate tors reposing upon each other in picturesque forms, as in the southern districts of the colony, although the blocks which adorn the latter are of more gigantic dimensions. The positions of these masses on each other at the junction of the frequently horizontal joint planes, give the appearance of an artificial character to some of them; but probably the ingenuity of man could not produce such a delicate adjustment of ponderous and unwieldy rocks as the elements of nature have accomplished by disintegrating the surface till these blocks become balanced upon a mere point or very narrow base. This phenomenon is very common in granite regions, and it is mentioned here, in order to point out that the granite of the northern as well as of the southern parts of New South Wales has been subjected to very great decay, and that it was once more continuous in the vertical and horizontal planes than it is at present. This is a point of importance in considering the probable origin of much of the gold that is distributed over the granite country. The mineral constituents of the granite are of the ordinary kind, but the elements vary in size and arrangements. Hornblende enters very considerably as an element of the granite.

The exception as to the structure of the granite upon the Gyra consists in its presenting horizontal joint-planes in such succession as to give the appearance of bedding. It is in this locality that the granite has been fissured and rent into gullies, just as the schistose rocks of the Apsley are further south; and a similar passage, by a succession of falls, is thus furnished to the eastern waters to leap from the tableland into the channel of the M'Leay, the distinguishing feature of all the affluents and sources of that river.

The superficial character of the granite country to the westward is smoothness, the falls to the Gwydir basin being crested by a flat and comparatively low tract, where the granite forms the Dividing Ridge. The prominent points along this ridge are all trappean.

2. As much of the Salisbury and Harnham Hill trap is highly silicious, the altered rock is also silicified, and it is very probable that the quartz-veins of a contemporaneous period may have been by its agency formed in the sedimentary as well as in the granitic formations into which it has intruded.

The schists, as well as the granite, have been subjected to the effects of some destructive agency, independent of mere *weathering*.

3. In many instances there is the clearest possible proof that basalts, as well as greenstones, have risen through the granite, which they overflow, producing in their disintegration by water the black soil of the plains, which covers up very frequently the basset edges of schistose and quartzose rocks.

The trap of the Dividing Range, at Williwa, which is in such intimate association with granite, assumes the granitic form, presenting a series of bosses which slope away in less and less prominent forms, and leave upon the horizon the outline of those similarly undulating ranges which characterise the existence of auriferous granite tracts. Such is the case with the Araluen Range, and with the auriferous granite hills between Omeo and Mount Buffalo, and indeed everywhere in which I found to the southward gold in the neighbourhood of granite. It is the nodular structure which produces these rolling outlines, as it is the prismatic which forms the peaks of porphyritic granite and basaltic rocks. None of these must be neglected, in forming an opinion as to the probable auriferous character of a distant range from its superficial appearance.

4. So far as I have been able to come to a conclusion in this respect, the prismatic outlines belong to the more recent portions of an igneous overflow, and the nodular form is most frequently associated with such granitic tracts as are found to be auriferous. The experience I obtained in this respect in the southern counties has been confirmed by my observations in the counties of Inglis, Hardinge, and Sandon; and as in the former, so in the latter, hornblendic and quartzose granites which are porphyritic appear to be more associated with gold than the other varieties of that rock.

There can be no doubt, at least, that gold in this part of New England is most abundantly found where granite has been disturbed and overflowed by hornblendic trap. This deduction has been confirmed by the testimony of the most intelligent of the observers amongst the gold-washers along the Uralla with whom I have conversed. The hills exhibit in the intimate association of the granitic and trappean rocks, the peculiar outline above alluded to, and a position at the head of drainages (running into the M'Leay and forming that river) which I have found to be auriferous. A similar association of granite and trap is also the distinguishing character of the country between the Bundara River and the line joining Boorolong and Ollera, for some distance west of the Dividing Range; and there again we find gold. In these and many other cases to the northward of the present area, as well as to the westward, there is the same relationship with trap and granite in association with gold, to the general exclusion of auriferous quartz in association with schists, although it is certain, from an infinity of circumstances, that the trap is younger than the schistose rocks, for they are transmuted by it.

5. That quartz-*veins* bearing gold do exist, there is, nevertheless, reason to believe, even as respects the granite itself; but, as about Major's Creek in the Araluen Field, so along the Rocky River (Uralla) field, these veins are generally small, and are connected with porphyritic patches, in which there is ferruginous matter, and the quartz appears to have been segregated. More to the westward there are auriferous quartz-*veins* in schistose beds, in the neighbourhood of the present Bingera gold-field, as well as in the Macquarie basin; but the quartz-*beds* which are so common in the schistose regions are scarcely ever auriferous; and I am led, by a multiplicity of facts all bearing one way, to conclude, that in New South Wales, if any of the auriferous rocks *can be considered anomalous*, the anomaly is *not* in the association of gold and granite, which, under certain conditions, is always found to be somewhat auriferous, and generally more so than the schists.

I need do little more to illustrate this fact, than mention the Araluen country; that along the Mitta Mitta, and between it and Mount Alexander, including the Ovens Gold Field, Moamba, and other tracts in the Maneroo districts and along the Alps; all of which exhibit the same superficial features and similar relations between granite and gold, whilst wide and lengthened tracts where quartz *beds* interpolate schists, and even quartz-*veins* (of certain normal directions) reticulating these, *are barren*. Should it be argued that the gold which is so universally distributed over tracts of granite, circumstanced as I have described, was originally derived from quartz-bearing schists, which have been denuded altogether, with the exception of the fragments yet remaining, in which case the *higher* tracts of these fragmentary schists ought to be auriferous if any are so, it must be left to the asserters of that doctrine to show by indubitable *proof* that such must have been the case. For myself I can only say, that, having sought for such instances of auriferous schists, I have never found any immediately *over* auriferous granite, at high elevations; and I have, over and over again, found granite at nearly all elevations parallel with those of existing *unauriferous* schists, to be *auriferous*. In the character of the gold itself, there is also a clear proof that it has not always had the same origin in time or the same matrix. Whilst gold derived from veins of quartz in schist puts on divers distinct and remarkable forms, gold found over granite bears a kind of universal character; being granular, fine, and of similar purity, such as well could be supposed to have been once entangled amidst the granular elements of granitic rock. There is little difference in these respects between the gold of the Uralla, of the Araluen, or of the Ovens Gold Field. It is immediately recognised by its features.

6. The origin of the gold, therefore, if derived from the same formations as those of which portions are still in existence, must be sought not in the compact baked silicious grits and conglomerates, but in the granite itself; and I will now advance a reason why I think in that portion of the granite which was once, or is now, in contact with trap of some kind, that is to say, on the *surfaces* of the granite or at the *outer portions* of the formation, in contact with some other formation.

7. It has been shown already that gold occurs at the Hanging Rock, and on the Peel in quartz-veins, in association with trap, passing through altered rocks, and the source of the gold is, in such a case (whether the veins traverse schists or shales, or sandstones, or any other rock), not in the rock bearing the veins, but far below, in the neighbourhood of the granite, the existence of which was demonstrated at a lower level in the bottom and ranges of Duncan's Creek. But in the case of the granite itself the conditions may be widely different.

It is a well-known fact, that metals frequently occur at the junction of granite with other formations, and that in some countries (Brazil and Russia), even stratified rocks become completely charged by gold, under the influence of the igneous agents that have transmuted them.

What reason can there be to doubt, that certain granites which are intimately allied to such ordinary igneous agents may not originally have been charged with gold whilst soft, under the ocean, by intrusive agents which may have also produced, by the assistance of steam, veins of auriferous quartz of various inclinations to the horizon passing through schists not visibly overlying granite, or themselves have elaborated the gold by agency of forces yet imperfectly known, at the upper surfaces of their masses, where they were in contact with overlying masses.

A metamorphic action in all probability would be traced (perhaps an interchange and commingling of elements or of the dispositions of these), could we strip the granite of its thick covering of basalt or greenstone or other igneous matter; and it is not improbable that such action would be found to have extended in such a manner into the surface of the granite, as to allow for a certain thickness of auriferous deposit. I conceive this to have been the case. His Excellency the Governor-General, as well as the Honourable the Colonial Secretary, will remember the example of granite covered by gold which I had the pleasure of exhibiting to them in August, 1852, from Major's Creek, in which the gold was in union with segregated quartz and iron; and this specimen was in conjunction with a porphyritic vein. Now, what has occurred in the Araluen gold-field and on the Mitta Mitta (in both of which localities I separated gold from granite by the blow of a hammer) has occurred on the Rocky River. In one of the workings I pointed out to the gold-washers a decomposing flaky covering from a large drifted mass of granite with particles of gold visibly apparent to the naked eye; and this could not have been washed into it. It was there, because the granite in which it was found contained it, before the boulder had been rolled down from above. It belonged to a mass which in all probability had been at the *outside* of the granite formation.

8. What is there strange in the belief, that on the outside of masses, that is, at the planes of junction of overlying and underlying masses, thermo-electricity and other allied agents may have elaborated the work of metallic production, as it has done in the case of the quartz-veins of the Peel River?

That the granite and the overlying trap were, one or both, formed under the ocean, or that the granite descended below the ocean level, and so became heated, since its original formation, and thus assisted in the changes of structure which have been mentioned, is not very improbable; nor is it improbable, that the basaltic and other trappean rocks which now pierce and overflow the granite, were (by the descent to the heated regions) then produced from the lower portions of the granitic nucleus.

It may be conceived how, under such a condition, the gold may have been produced under the ocean level, just as when the auriferous mass in reascending became exposed to the denuding power of the waves, and to the effect of pressure, its surface and slopes would be rent and fissured, and the softer parts being removed, the heavier gold would be left, as it is now found, scattered over the surface or collected in hollows then first formed, afterwards to be attacked by elemental forces of the upper air, the floods and streams of the modern epoch.

9. If such an origin for the gold over granite be admitted, we ought to find some corroborating circumstance to correspond. It is determined that boracic acid rises with steam in the "lagunes" of Tuscany in connection with igneous agency (Murchison). It is also found in association with deposits of rock salt, and may be, therefore, in some way present in sea-water or others during a plutonic eruption. "The transmission of mineral matter from the igneous and heating body into the prior formed rocks, whether these were or were not consolidated, seems well shown when boracic acid is present among the former." The celebrated geologist (Sir H. de la Beche) from whom these words are quoted, explains the well-known fact that tourmaline occurs on the outer portion of granite. He adds further: "The boracic acid might, indeed, have solely escaped out of the granitic mass, and meeting with the other essential parts of schorl, have produced the latter mineral amid the grains of mechanically-formed rocks thus acted upon." Again, he says, "The presence of a mineral in any abundance which con-

tains boracic acid as an essential ingredient is one of importance, more particularly when we refer to the researches of M. Ebelmen, he having shown that by employing that acid as a solvent, at an elevated temperature, minerals may be produced by the evaporation of this solvent, some of them gems, such as *rubies*." And in a note, he quotes the result of M. Ebelmen's experiments to have been the "production of *rubies, sapphires, chrysoberyl, chrysolite, chromate of iron, and others*."

10. Now, it is most remarkable, that all over the tracts in which gold occurs amongst granite, such as the Ovens, the Alps, and New England, the gold is accompanied by a marvellous abundance of *rubies, sapphires*, and other gems, to the almost total exclusion of magnetic iron (*vulgarly called emery*), though true emery does occur, whilst, in other localities of gold, magnetic iron is a principal indication of the metal. In the New England gold districts, as in the southern districts of granite, the indications are rubies and sapphires.

11. The Rocky River is a *western* water; Tilbuster Creek an *eastern* water.

So abundant are these gems, that they may be procured anywhere in the surface drift of New England, and in the granitic tracts, in any quantity and of all sizes. Most of them are water-worn, in about the same degree as the gold, but I have found some perfect unabraded crystals of the usual octahedron form, which leave no doubt as to their identity. My opinion is, for reasons stated above, that these gems have been elaborated in the way mentioned, at the outside of the granite, or at its junction with overlying rocks; and, as constant concomitants of gold in the granitic region, and regarded by the gold-washers as the truest indication of that metal, they must be considered as having a derivation from the same geological surfaces. I know but of one instance in all Australia of the occurrence of these rubies in any sedimentary rock; that is at Kayon, on the Richmond River, where spinel rubies of minute proportions occur abundantly in a fine sandstone of that carboniferous tract; these were, perhaps, derived from the igneous rocks of which most of the beds in the Richmond district are the re-composed materials.

12. Probably the point may be conceded, that the gold as well as the gems in the granite country had its matrix on the outer portions of the granite, and the granite at the junction of other rocks. Some of these having been denuded, as we have seen already, much disintegrated and decayed, the heavy gems and the heavier gold have been left in the granitic sand, and in the scaly soft surfaces of still decomposing drifted blocks of granite, now filling the creeks and river beds, and which once belonged to the upper and outer portion of the granite masses.

13. Being under this impression, and seeing how completely a wide region in New England, both on the Western and Eastern Falls, is occupied by granite either partly destroyed, or still attaining a considerable elevation, and knowing that much of this granite is still covered up by partial relics of younger formations or by universal gem-and-gold-bearing local drift; seeing also how thoroughly this region has been pierced and overflowed by igneous rocks of various kinds, I cannot but conclude that there is a vast amount of gold scattered over this portion of New South Wales, and along both falls from the table-land; and so far as experience goes, this geological inference is borne out by facts. For, whether in small quantity or in abundance, every creek and river, and the deposits of drifts upon the surface of the country are found to contain gold and gems. And yet, in consequence

of its depth, and from want of water, much of this gold can never be obtained.

14. The difference between an auriferous country of granite and one in which the gold is found in veins, is as much marked by this universal distribution of gold as by its occurrence in nearly equal sized particles; and a little reflection will show why this equality in size and distribution is to be anticipated. Igneous rocks of intrusion rise either in a series of separate local foci of eruption or along lines of fissure. It is probable, that in neither case is the orifice large; but as all such eruptions must be preceded or attended by numerous fissures, either parallel to the axes of the disturbed and dislocated masses, or radiating through them from the centre of eruption, the formation of veins accompanied and followed by all the phenomena witnessed in the production of metallic ores or native metal, is the result. Such veins passing through overlying deposits are locally richer than any occurrence of metal produced, as supposed in the case of granite gold. Inasmuch, too, as the metal so produced is in massive lumps or bands, or crystallised on the large scale, and the veins are continuous through the whole mass of overlying rock, when such a rock and its veins are broken up, the auriferous detritus is proportionably on a scale of magnificence. Hence, gold derived from considerable quartz-veins will be in general, *locally*, far more abundant than the gold derived from an equal space, where it is diffused in the surface of a mass of granite. The circumstances, too, of the case agree with the expectation that such sources will be permanent. But, in the case supposed for gold derived from granite, inasmuch as the auriferous portion of the rock is, at the best, but thin, in order for a locality of auriferous granite to rival and excel in the richness of its produce that of a locality of vein-gold, there must be a wider surface at the contact of the adjoining rocks; and if this be denuded, of course that surface may supply as much as, or more than, the very richest gold-vein in schist or in any other rock. Still in time it will be found that a supply from good veins is likely to last longer, because the veins are probably, for at least *some distance* downwards, as rich as they are near the surface where they are exposed, whilst the auriferous granite, furnishing only a supply which is commensurate with an inferior depth, must much more easily be cleared of its contents.

15. It will be seen also, that such veins in their destruction supply to the local reservoirs much massive gold, and that these veins become triturated, and afterwards dispersed nearly only along channels in which continuous streams can carry on the process. But when granite which is auriferous has been stripped of its covering, and has begun over wide areas to decay, or when the violent debacles (which have anciently laid waste not only the schists and their veins of gold, but have swept away the covering of the granite) began to disperse the detritus of the respective regions, the fine granite gold was more evenly and generally distributed than the heavier masses from the schists, or capriciously collected in the hollows of the surface soil, or washed further away from its source by running streams. The actual history of the gold-fields of the Macquarie basin, and that of such fields as those in the granite regions of Victoria and of New South Wales, testify to the soundness of the view here taken. *A priori*, therefore, it might have been anticipated that a gold-field in a region of quartz-bearing schists will last longer than one in a granite region; but that in the former a smaller number of workers will only find *permanent* employ, or be able to find room; whilst a large number of adventurers in the granite field

may for a time accumulate enormous profits, and yet at length discover that the supply is *not permanent*, or capable of maintaining to advantage a covetous multitude.

16. Such is the fate, it is to be supposed, of many of those tracts of country, the richness of which has, perhaps, appeared inexhaustible to some; and the comparative facility with which gold is procured from detritus of granite, without the labour attendant on gold-digging, amidst boulders and heavy gravel, will, of course, precipitate the consummation. Yet it must not be forgotten that a far wider *space* may be expected to be auriferous in a granite region than in one of schist; though in the former there may not always be so many prizes as in the latter. When, however, as in the case of the New England districts, there are both vein-gold and granite-gold, and all the rocks over a vast area to the westward appear to have been more or less affected by gold-producing phenomena, we may safely anticipate that there is much gold yet to be discovered in the alluvia around the detached ranges between the table land and the flat interior, and that, hereafter, as the seasons may suit and diligence be called into requisition, not only the Hanging Rock and the Peel, and Bingera, and the Uralla, but divers other localities, will supply, if not to a multitude greedy of great gain, but to men *contented with moderate gains*, gold through many years to come.

21. The gold and gems which are on both sides of the range (both on eastern and western waters), could not have been dispersed by the bursting of a barrier to the eastward, and by the discharge of waters which would not have been retained on the western side. Such a disruption would only have left its traces in a very limited space: and what is called the table land is merely a sloping plateau.

22. I was called upon to review a similar question in Maneroo. There, as here, exist numerous hollows in which rain-water accumulates, in which are eroded blocks of granite, and on the shores of which ironstone and water-worn baked grits are in association with trap. Though in Maneroo there are a multiplicity of lakes formed by hollows in the trap rocks, as well as swamps, just as there are in New England, there was nothing more satisfactory to my mind there than is here, as to the existence of vast reservoirs of deep water, upon the present narrow and broken table land. The dispersion of the gold is, therefore, due to some other cause. So far as Maneroo is concerned, the melting of snows, when a country was at a higher elevation, seems a a more probable cause of dispersion, either in connection with, or independent of, a diluvial torrent.

23. I suggested recently in a letter to Sir R. I. Murchison, that the dispersion of the gold might have been in some degree connected with the melting of the snows, as well as with the subsidence of the land. In coming to a safe conclusion as to the breaking up of the auriferous formations and the consequent first dispersion or accumulation of the gold, the deductions from the consideration of the existence of *polished* rocks and their probable origin must not be lost sight of. Further, it may be remarked, that the ocean current which has scattered the local drift in the present auriferous localities came from the southward, *i.e.*, from the colder quarter.

24. The fossil wood which is so abundant on the highlands of both Maneroo and New England also offers a further argument. When were they fossilised? In the Hunter basin and Illawarra they are undoubtedly of the age of the coal beds.

Now if these trees, which are not casuarina or of the kind of pine which still is found on the Dividing Range (as near Salisbury), did not grow on the table land, *whence* were they drifted?

25. They must have come from a carboniferous formation which does not exist at all, or from the *over-arching* beds of that formation which now exists east, west, and northward of New England, and which, in geological sequence, must have been many hundred feet higher than the highest of the elevated transmuted rocks upon the Peel and its sources. Geology is conversant with such over-arching forms and with such denudation of strata.

But if we admit this, it could not have been denudation which could scatter gold from a height of 20,000 feet, as some have imagined, the product of beds *above* the carboniferous formation alluded to; for the gold would all have disappeared with 20,000 feet of matter, and could not have rested upon the cordillera at all, when so decapitated; nor could there in such a case have been such reservoirs of water as others have imagined, and of which the present surface, water-worn as it is, affords no sufficient evidence.

27. The above remarks will serve to meet a conjecture respecting such gold as appears in New England amidst granite. It is said by some, that such gold (as it occurs at the Ovens) has been *recently* drifted.

We may ask, whence would it have drifted up to New England?

It may have drifted from the granite ranges immediately overhanging the Oven and its creeks, which are at a very trifling elevation above the sea compared with the head of the Peel, of the Rocky River, or of Tilbuster Creek.

It could not have been drifted *up hill* from the Lower M'Leay or the Gwydir. Wherever it comes from, it has not travelled far. If it came from the now denuded schists, and supposed carboniferous beds, where in those rocks elsewhere, do we find such abundance of gems, or where are the fragments of gold and auriferous quartz-veins, the gold of which is so very different? I see no other conclusion, therefore, than that to which I have come:—it is *local* gold, and its first dispersion took place by the waters of the ocean, the waves of which have left their traces not only in the destruction of hardened rocks, but in the accumulation of the fragments which they produced upon the land, during one of its ascents from below, and in the palpable erosions of the granite itself even upon the summit of the ranges as well as in those hollows, which even now retain the appearance of shallow lagoons.

28. As the wear and tear of the elements continue, now the land is again risen, no doubt decay goes on, and year by year the surface of the auriferous granite becomes more and more exposed; and thus the gold is collected into the drainage channels, and will, doubtless, be collected still, till these decaying store-houses of wealth have disappeared, and man has gathered it into his own garner.

29. The localities in which it is known to occur in the present area are very many, but in some it is more abundant than in others.

I think it not unlikely that a man might obtain at least five shillings per diem from gold alone in some parts of the Tilbuster country; but the abundance of gems would, even at a low marketable value, increase the profit.

I do not know what these may be worth for the use of the lapidary; but at present they are thrown away in vast quantities as valueless, and are regarded by gold-diggers as an inconvenience, it being difficult to separate them from the gold.

30. On the western side of the Range there is gold in all the creeks and river channels at the head of the Gwydir. No activity has yet been displayed except on the Uralla, which has been worked (under the head of the "Rocky River Diggings") from about three miles above the junction of the Kentucky branch to a short distance from the junction with the Bundara, in all about fifteen miles.

33. In the preceding details I have stated fully what are my views, and though I have therein pointed out that a granite gold-field is not always likely to be of very long continuance, in consequence of the facility of obtaining its alluvial gold; and on former occasions have shown that difficulties of other kinds exist, likely to aid the prejudices of gold-diggers in general against such *fine* metal as such a field alone supplies, I think that as the researches of those employed are extended, other spots than those now worked will be found along this river, and on other streams belonging to the same system of waters. At present only two or three parties have employed any engineering skill, nor have the boulders been removed from the bed of the river in more than one or two claims. I do not doubt, that under these there is much gold.

But, extending our views beyond the present moment to times when, it is to be hoped, wages will be moderate and provisions at reasonable prices, it is more than probable that a great number of persons will be able to find constant employment as gold-washers, not only in the rivers, but even on the table land itself.

34. I have already given my opinion as to the probable future importance of the country between this and the junction of the Namoi and Gwydir, over which, I am thoroughly persuaded, gold is to be found in numerous localities.

To test this experimentally, and as it ought to be tested, is not in my power, nor in that of *any single individual;* it is the work of a multitude.

Yet, though "*caution*" is necessary in deducing extensive conclusions from the limited data supplied by what one set of gold-washing implements can supply, and in the excitement of the public mind it may require *extreme* "caution" when dealing with the commercial value of a country as a gold region, I think sufficient has been advanced by me in this Report and in those which precede it, which may be considered satisfactory as to the inference, that the Hanging Rock and Peel River Gold Fields are the "outskirts" of one of wider extent.

To the Hon. the Colonial Secretary. W. B. CLARKE.

THE ROCKY RIVER, &c.—Letter from E. H. HARGRAVES, Esq., to the COLONIAL SECRETARY.

Armidale, New England, March 15, 1852.

SIR,—I have the honour to report, for the information of his Excellency the Governor-General, that I have examined the following localities, numbered respectively 3, 6, 8, and 10 in Mr Tucker's letter to you as Secretary to the Maitland Gold Reward Committee.

2. (No. 3.) The Macdonald River, at the crossing place, is composed of granite. I did not find any gold until reaching a point about four miles above it, where the trap formation commences, the same as at the "Hanging Rock," with small veins or threads of quartz running through it; from this point upwards the prospects are about equal to Swamp Oak. There are no persons at work on the river.

3. (No. 8.) Carlisle's Gully, at the crossing place, a chain of ponds; formation granite, with veins of ironstone. This locality is not likely to produce gold of any consequence.

4. (No. 7.) Heads of the Bundarra; the formation is the same as that of No. 8, with fragmentary quartz in very small quantity. Probably lower down gold may be produced.

5. (No. 6.) The Rocky River; the formation, at the crossing place, is the same as No. 7, with the like prospects.

6. (No. 10.) Tilbuster Creek, four miles from Armidale, may be compared with No. 8; the formation is different only by there being a greater quantity of ironstone.

7. Being desirous of reaching Moreton Bay as soon as possible, I have not deviated much from my due north course; consequently I have not visited the other localities pointed out by Mr Tucker, viz., 4, 5, 9, 11, and 12. I should have done so, however, had I heard an account of the country that would have justified an addition of 400 to 500 miles to my journey.

8. It would thus appear that we have not only a Western and a Southern, but also a Northern Gold Field. The last commences at the head of the Peel, and includes the Hanging Rock, and the head of Swamp Oak Creek, and the head of Macdonald River;—the whole of which will produce gold,—the richness of which, however, can only be ascertained by actual working, but the numbers at present so engaged are far too small to accomplish the desired object over such a great extent of country, which forms a semicircle seventy miles round; it promises well for dry diggings in several places. The want of water at present for prospectors is a great drawback to their development.

9. My present address will be Tenterfield, where I shall probably be for ten or twelve days, in order to examine the Mole near that place, which has been spoken of as likely to prove an auriferous country.

10. I will here state that I have been unable to comply with many requests to visit different parts of the country, described as being "close to my camp;" but as these places are respectively 70, 100, and 120 miles distant, I should, to visit them, occupy time which I cannot spare, and require means which I do not possess.

I have, &c.,

E. H. HARGRAVES.

The Honourable the Colonial Secretary.

GEOLOGICAL SURVEYS OF THE WESTERN DISTRICTS OF NEW SOUTH WALES.

Extract from Report of Mr STUTCHBURY, Government Geologist.

Camp Wellington, January 26, 1852.

After leaving the sandstone of Burrandong on the road to Wellington, the country on the south-western side of the Macquarie River for ten miles is schistose in all the varieties before described, carrying large quantities of quartz rock, undoubtedly auriferous.

At this point a narrow limestone shows itself, followed by trachytic porphyry (the glassy felspar in large crystals), with occasional schists intervening as far the Wellington Valley or flat. The Wellington Valley is for the most part composed of gravel and sand of considerable thickness, with here and there a hummock of altered schists and trappean rocks. The celebrated caves of Wellington are situated in the northern outlier of coral formed limestone; the fossils are of the same character as those found on the Nubrigan, the Bell River, and at Molong.

To the westward of the limestone, the range, of which Mount Arthur takes precedence, including Glenfinlas and Diram, consists of sandstones of various textures, from a granular quartz of fine grit, to a conglomerate of a very coarse grain, many of the pebbles being six inches in diameter, cemented together by oxide of iron, much resembling many of our English sandstone rocks of the old red formation. I merely, at present, venture an opinion as to its geological age.

The character of this sandstone, and the fossils of the limestone, incline me to a very strong opinion that they are, as regards the types of animal form, identical with the Devonian system, certainly older than the carboniferous limestones of Europe. In addition to the fossils mentioned in my former Report, I have met with a species of Pyrites, allied to pyriformis (but larger in the star shells), and to Caunopora ramosa.

At Newrea, better known by the name of the Black Rock, on the road to Molong, about ten miles from Wellington, the limestone again appears like an island. The rock which gives name to the place is a very hard slate, strangely altered and contorted.

There is also limestone at Morigalan, on the south side of Macquarie River, at Nanima, on the north side, and about four miles N.N.W. from Nanima, which extends to Gobolion, from thence to Miccagymoggy, at which point it crosses the Macquarie River.

Taking the Mudgee road from Wellington, after reaching Nanima, or Mount "Diehard" of Mitchell, the usual altered schistose rock continues until arriving within a quarter of a mile of Mitchell's Creek; at this point a dark green hornblende slate is seen. Immediately after crossing the creek an immense outburst of granite occurs, of a very coarse grain, composed of quartz, black mica, and felspar, many of the crystals of felspar being from three to six inches in length.

The upper part of Mitchell's Creek, which passes through the granite to a considerable extent, is completely filled by its debris; and, although this creek has hitherto been held to have been the place where gold was first found in the Wellington District, I believe this upper part of the creek will not be found remunerative. The more northern portion is doubtless auriferous to an extent which would repay labour properly directed; but the great difficulty in reaching the bed rocks, in consequence of the large accumulation of the sands, which are saturated with water, could only be overcome by the outlay of a large capital.

That the gold, as in other places, originates in the quartz lodes so numerous upon the mountain sides and summits is well ascertained.

I did not succeed in finding gold on the Eumbi Creek. Upon reaching Lahy's Station, which is situated near the confluence of the Eumbi Creek with the Cudgegong River, and following the river down, found gold in numerous places between the Eumbi and Bimbijong, retained in the drift sands in a similar manner to that of the Turon; and I believe that when worked in a more efficient manner it will prove highly remunerative.

The principal object of visiting this portion of the river was to prove the presence of gems, and I was gratified by finding in the first washing small specimens of ruby, sapphire, and chrysolite, and subsequently topaz, hyacinth, amethyst, and cairngorm; such as I obtained by washing in addition to some I purchased I distributed among the most intelligent of the miners, for the purpose of making them acquainted with the appearance of such gems. As fine or small grained gold has, in most instances, preceded the discovery of large masses, it is highly probable that gems of large size and purity, and consequently of great value, will be found, adding considerably to the wealth of the colony in addition to gold.

"Molly's," "Jock's," and several other creeks in the neighbourhood were examined, and gold was found in each; and from the large extent of quartz rock developed in this part of the country, together with the extensive ochreous loamy flats receiving the drainage of ranges before it reaches the creeks, I believe this part of the country may be highly productive of dry gold-diggings.

All the main ridges, west of the Little River, to the base of Harvey's range, are granite, with small intervening strips of metamorphose slaty rocks.

These schists carry small lodes of quartz and titaniferous iron, and are probably auriferous, but the absence of water prevented my proving this circumstance. In the "Meadows" Creek, which falls into the Wambangalang Creek, a micaceous sandy flagstone, valuable as a paving stone, might be quarried, bearing N. 10° E. with angle dip 15° to the west.

At Burrandong, in the dry diggings, I discovered crystals of Anatase (Octohedrite), a species of Titanium, which I consider important, in consequence of its being one of the minerals accompanying gold, as at the Minas Geraes in Brazil, and also at Itabiro de Matto Dentro, where it is associated with diamonds.

Asbestos occurs at Guyong, near the Cornish settlement, and at the Benada Creek, Wellington.

S. STUTCHBURY.

To the Hon. the Colonial Secretary.

Report from Mr SAMUEL STUTCHBURY to the COLONIAL SECRETARY.

Camp, Gobolion, near Wellington, April 12th, 1852.

Crossing the Wellington Flat to Newrea, and from thence to the "Three Rivers," schist and trap rocks are prevalent. At the fall or ford called the "Government Fall," gold in specks was found, which may be received as the general character of the gold found on the Bell River, I also observed at this ford the following gems, namely, sapphire, topaz, and chrysolite, in the form of sand. Gold has also been found within half-a-mile of the village of "Blackrock," in the Dripstone Creek. The table lands and bold hills which form the dividing ranges between the valleys of the Macquarie and Bell Rivers are composed of basaltic whinstones, flanked in several cases by a conglomerate, the disintegration of which has disengaged large numbers of pebbles of quartz I have not at present determined whether this conglomerate be auriferous or not. Near this spot (marked on the map) is a "boss" of serpentine, "ophite," similar to that at the "Wentworth" mine; this rock, in conjunction with the trappean rock above described, I consider a good indication of gold, and the result among the few schists which occur in the above-named creek, verifies my opinion. At Summerhill, a few yards beyond the burial place, an isolated mass of serpentine "ophite" protrudes itself. Serpentine is again seen at Mr Wentworth's diggings, containing veins of amianthus. This mass of serpentine had escaped my notice on my former visit, being at that time coated by loam and the debris of the quartz; I now find it denuded by the miners, who have worked it very successfully for gold.

The occurrence of gold in the ferruginous quartz of this locality, apparently a regular lode, I again allude to, in reference to the similarity of circumstances attending the "Eisenkiesel," together with the white quartz, granite, porphyries, schists, &c., in the Carcoar district, especially about the Cowriga Creek mentioned in a former report; and I am of opinion that, from our increased knowledge of the gold "gangues," those localities in the Carcoar district are worthy of a closer inspection. The trap rock which forms the southern back of the quartz lodes of Frederick's Valley contains a very large proportion of titaniferous iron, and also slight indications of copper: the flanks of these ranges also exhibit large quantities of "bog iron," and it is very probable that this bog iron may have picked up fine grained gold during the process of its induration.

In passing Pretty Plains, towards "Corse's New Road," the ranges are basaltic, with olivine and altered greenstone, and hornblende slates, and the black soil of the plains is almost entirely made up of iron sand to the depth of several feet. The country through which Corse's Road passes consists of schists and quartz, until arriving at the "Rocks." On the right of the water holes large bodies of quartz rock occur, and gold has been found there in small quantities. From the "Rocks" north and south, with the usual deviation of 10°W. and 10°E., the granite of Bathurst exhibits its western edge; it crosses the "Swallow Creek," extends over the Macquarie River, and joins that previously coloured on map, as occurring in the angle between the Macquarie and Summerhill Creek. Most of the hills, mounds, or raised ground of the Bathurst Plains have granite *in situ;* the remaining portion or low lands being entirely made up of granite debris, the quartz predominating; and in this loose gravel, not exceeding two feet beneath the surface, I succeeded in obtaining gold from a very small quantity of washed earth. The trial was made at "Kelloshiels" (Mr Rankin's). A copper lode was discovered by Mr Rankin at this place, while sinking a well for his brewery, at a depth of twenty feet; he showed me a very good specimen of green with blue carbonate of copper, and, as a proof that it must be of some extent, the water of the well continues so much impregnated with it as to render it unfit either for brewing or for culinary purposes.

At Saltram there are two large and extensive lodes of quartz, and other minor lodes exist, taking a north and south course across the plains. These, taken together with the occurrence of trap rocks, are sufficient indications of auriferous deposits to warrant an opinion that the whole of the plains, under proper economic management and outlay of capital, may prove of vast importance as an integral portion of the already large Western Gold-Field.

II.—VICTORIA.

COUNCIL PAPER ON THE VICTORIA GOLD-FIELDS.

By Mr SELWYN, Government Geologist.

Report on the Geology and Mineralogy of Mount Alexander and the adjacent country lying between the Rivers Loddon and Campaspe.

The whole of the above district is occupied by four different geological formations, viz.: 1. Granite. 2. Metamorphosed palæozoic rocks. 3. Basalt. 4. Auriferous drift.

The extent of country occupied by the three first of the above formations may be seen by the accompanying tracing of the map, on which the boundaries are laid down by compass bearings. The fourth is more or less universally distributed over the area occupied by the second.

1. GRANITE.—This rock everywhere forms an open forest country, consisting of high rocky ranges and undulating grassy hills. Enormous blocks, standing out in bold relief, lie scattered on the summits and flanks of the hills, often affording the most picturesque scenery. These blocks are always *in situ*, and are the result of the decomposition of the surrounding softer portions of the rock. It is for the most part a coarse-grained ternary granite (quartz, feldspar, and mica), often very soft, friable, and easily decomposed. In some few places it passes into pegmatite, a compound of quartz and feldspar.

The granite frequently possesses a largely spheroidal or concretionary structure, composed of concentric coats, and the whole being traversed by a system of N. and S. and E. and W. joints causes it to break up into large rectangular blocks or slabs, with slightly convex and concave faces. These blocks afford a good and easily-quarried building material.

Numerous "elvans" or dykes occur, cutting through the granite in various directions, in long narrow bands. They are generally composed of a hard, compact, and very fine-grained granite. They do not appear, as is often the case in other countries, to be accompanied by metalliferous veins. I have been unable to discover metalliferous veins of any description in the granite, and from the general homogeneous character of the rock, and the entire absence in it of quartz-veins, I should not anticipate the discovery of gold or other metals, either in the rock itself or in the drifts derived from it.

2. METAMORPHOSED PALÆOZOIC STRATA.—Surrounding the above granitic district on all sides except to the south-west, where the granite is overlaid by the lava plains of the Loddon, we have a mass of metamorphosed palæozoic strata, striking everywhere nearly true N. and S., and dipping E. and W. at angles varying from 45°.to vertical.

These strata, the whole of them aqueous sedimentary deposits, consist of,—interstratified in thick and thin beds,—1. Ferruginous, micaceous, and felspathic sandstones and grits of various shades of red, brown, and yellow. 2. Hard and soft arenaceous and feldspathic clay slates, and fine arenaceous banded flag-stones. 3. Quartz rock and fine-grained quartz conglomerate.

The country occupied by these rocks consists chiefly of bold, rocky, scrubby ranges and gullies, thickly timbered, and of more openly timbered flats. The highest points of the ranges are almost immediately adjoining the granite boundary. This is a very marked feature; the junction of the granite and metamorphic rocks being almost invariably at the base or on the flanks of a steep rocky range. The palæozoic strata everywhere, for a short distance from the granite, exhibit traces of alteration, being generally harder, more compact, crystalline, and micaceous, but very rarely passing into true mica schist.

The whole mass of these sandstones, grits, clay-slates, &c., is traversed by an intense N. and S. cleavage, as well as by a system of larger joints, striking both N. and S. and E. and W., the former generally dipping at right angles or in opposite directions to the planes of cleavage. This system of joints and cleavage renders the true lines of stratification or original deposition very obscure. They appear, however, generally to coincide with the cleavage, but for the most part are dipping at a somewhat lower angle, which can only be detected on a close and very careful examination.

Coincident with the cleavage both in strike and dip, and more or less numerous throughout the whole of the palæozoic strata I have examined, are veins of white and reddish ferruginous quartz, from a few inches to six or seven feet in thickness. Coating the joints and fissures in some of the larger veins, we often find much red hæmatitic iron ore. In the quartz occurring in nests and cavities I have found — 1. Gold. 2. Galena, in very small quantities. 3. Blende (sulphuret of zinc). 4. Arsenical iron. 5. White iron—pyrites.

I have heard of platina having been found, but I have not seen any.

I have been unable as yet to detect any organic remains in these rocks, and have therefore at present no good evidence as to their actual geological age. Judging merely from lithological character and general appearance, I should, however, consider them to be equivalents of the Cambrian or lower Silurian strata of Great Britain, portions of which, as seen in North Wales, they precisely resemble.

3. Basalt.—Resting horizontally on Nos. 1 and 2, in isolated patches and large tracts, forming table-lands, flat-topped rocky hills, with steep escarpments, and extensive undulating plains, are large masses of basalt, composed chiefly of augite, hornblende, magnetic iron, and feldspar, sometimes very hard, heavy, and compact, and often cellular and scoriaceous, having the appearance of sub-aerial lava. The vesicles are filled or coated with carbonate of lime, and specular iron in mamilated crystals; on the weathered surface these vesicles are generally empty, the carbonate of lime and the iron being decomposed, and the rock having externally a very red and rusty appearance.

This basalt is evidently the remains of vast lava streams which have flowed down and filled up the existing valleys of the country, bringing them nearly to a level with the tops of the lower ranges. Through these lava streams the present river channels have been subsequently denuded, always exposing, when cutting sufficiently deep, the subjacent granite or stratified rocks on which the lava has flowed. The isolated patches of lava, as seen on the map, especially along the course of the River Coliban, are interesting as evidences of the former extent of the lava, and of the great amount of denudation which has taken place since its formation.

On the surface the lava has generally a spherical concretionary structure, breaking up into rounded or subangular blocks. This structure, wherever the lava attains a considerable thickness, becomes columnar, probably due to the slower cooling and more perfect crystallisation of the lowest portions of the mass. A good example of this may be seen at the junction of the Campaspie and Piper's Creek, where the lava and subjacent stratified rocks are exposed in almost perpendicular cliffs from 200 to 300 feet in height.

4. AURIFEROUS DRIFT.—This formation, of very late tertiary date, varies in thickness from a few inches to 100 feet and upwards. It consists of stratified and unstratified masses of ferruginous clays, sands, and gravel, interspersed with angular and partially rounded fragments of clayslate, sandstone, quartz, &c.

It occurs almost universally, distributed in the gullies, on the flats, and over the hills occupied by the palæozoic strata, and is, in fact, formed from the decomposition, breaking up, and spreading out of the immediately subjacent rocks; the fragments found in it being, with a few local exceptions, seldom much water-worn, and bearing no evidence of having been transported from a distance. The lowest stratum or bottom almost always varies in colour and character with the nature of the subjacent rock, whether a ferruginous clayey sandstone, forming a red or mottled ferruginous sandy clay or gravel, or a soft feldspathic slate, producing a white pipeclay, &c.

With respect to the origin and present position of the gold, there can, I think, be little doubt—1st. That the whole of it has been formed in OR NEAR the quartz-veins, which are now seen traversing the palæozoic strata. 2nd. That its present position in the drift is entirely due to the decomposition, breaking up, and spreading abroad of these quartz-veins along with the ordinary sandstones, slates, &c., of the district. Its general position in the lowest portion of the drift resting directly on the solid rock is due—1st. To its great specific gravity as compared with the rest of the materials forming the associated drifts. 2nd. It has always been supposed that gold-veins are richest near the surface; and, unlike other mineral-veins, gradually become poorer the deeper they are followed. Such being the case, it follows that the deposits now occupying the lowest portions of the drift, formed from those portions of the auriferous quartz-veins which were first broken up and distributed during the period of the drift, would be much richer than any deposits formed by subsequent denudation from less superficial portions of the auriferous veins; and all experience tends to prove that such is actually the case.

With respect to the range and extent of this drift formation, I can only state that every part of the country I have seen which is occupied by palæozoic strata is more or less covered with drift of the same character, derived from rocks abundantly intersected by quartz-veins. The real value of it can, however, only be ascertained by actual working.

Between the western boundary of the granite and the River Loddon this drift appears to attain a very considerable thickness, forming an almost level forest country, extending for many miles, and quite concealing the underlying rocks.

ALFRED R. C. SELWYN,
29th September, 1853. Geological Surveyor.

ACCOUNT OF THE VICTORIA GOLD-FIELDS in a Despatch from LIEUT.-GOVERNOR LATROBE. (1853.)

I present the following report for the information of Her Majesty's Government:—

In the case of the workings at Anderson's Creek, sixteen miles from Melbourne, though the ground was placed at the close of August under the direct supervision of the Crown Commissioner of the county of Bourke, and no person allowed to continue the search for gold without permission, it was evident that the constant rains and floods interposed such obstacles in the way of the work attempted to be carried on in the bed of a watercourse, as to render any steady gain out of the question; and subsequent events, to be presently referred to, have caused the almost entire temporary abandonment of the ground.

The workings at Clunes, ninety miles from Melbourne, on one of the head waters of the West Loddon river, were more perseveringly carried on for a time, during the latter part of August and beginning of September. The people congregated there were subjected to the occasional oversight of an officer of Government, and surveillance of a small detachment of the native police-force, with the full understanding that licenses must be taken out as soon as the proper officer was in a position to come upon the ground, and carry out the regulations. But before this could be done they also were suddenly deserted, not from any real unproductiveness, but from the discovery, within a distance of thirty miles, of the new gold-field, to which I now turn.

A personal visit and inspection of the ground, from which I returned a few days ago, has been of great use to me in forming a judgment of the real state of the case.

The locality now known by the name of the Ballarat Diggings lies about six miles in a direct line from the remarkable volcanic hill still known by the native name of Boninyong, and to the west of Warreneep, another eminence of similar origin, rising on the same ridge or watershed. The geological formation of the country would appear to be the ordinary quartz ore, iron, sandstone, and clay slate, which is so general throughout this colony. Golden Point, where the principal workings at Ballarat have been opened, presents, superficially, no feature to distinguish it from any other of the numerous forested spurs which descend from the broken ranges at the foot of the higher ridges, and which bound the valley of the Leigh on either side. Yet, although it is now seen that the gold is to be found in one position or another, in greater or less quantities, in the whole of the surrounding country, both on the ranges, or in the flats, or in the watercourses, various causes would seem to have given this particular point a superficial structure at least very distinct from others in its neighbourhood as far as they have been examined, and have made it the depository of a far greater quantity of the precious metal, within a limited area, than has hitherto been discovered. This particular structure, as far as it is now disclosed, would appear to be confined to the lower, and especially to the northern and north-eastern portions of the extreme slopes and extremities of the spur. Roughly stated, a section of a working shows, under the superficial soil:—

1. Red ferruginous earth and gravel.
2. Streaked yellowish and red clay.
3. Quartz gravels of moderate size.
4. Large quartz pebbles and boulders; masses of ironstone, set in very compact clay, hard to work.
5. Blue and white clay.
6. Pipe clay.

Below which none of the workings have as yet been carried. Yet, although such may be the general order of the strata, nothing is more striking than the irregularity of the proportions in which they are found to be distributed, the variety of inclination observable within a limited space, or the unequal depth at which any given stratum may be found to lie below the surface. In some workings the pipe-clay may be reached at the depth of ten or twelve feet: in others, not at thirty or upwards. In fact, there are hardly two workings, however, approximate, which furnish similar sections. Gold has been detected, I believe, in all the superior formations, even in the superficial soil. But by far the richest deposit is found in small veins of blue clay, which lie almost above the so-called "pipe-clay," in which no trace of the ore has been discovered. The ore is, to all appearance, quite pure. It is found occasionally in rolled or water-worn irregular lumps, of various sizes, from a quarter or half an ounce to one or two ounces in weight, sometimes incorporated with round pebbles of quartz, which appears to have formed its original matrix; at other times, without any admixture whatever, in irregular rounded or smooth pieces, and again in fused, irregular masses of pure metal of great beauty, weighing, in some instances, seven or nine ounces. It is also found combined with quartz pebbles or gravel of various sizes, evidently united to them while in a fused state, and on the surface of the detached masses of iron sandstone, but in the greatest abundance in the clays, from which it is washed in the form of rounded or flattened grain, like sifted gravel and sand of varied sizes. These will, however, be frequently seen to be interspersed with larger pieces, either pure or combined with quartz, as before described.

I have met with no instances in this locality of the form commonly called "scale gold." The seams of the auriferous blue clay, the general position of which I have described, are found to be most irregular in their deposit, and seldom more than four or five inches in thickness. They appear, disappear, and break off, and thin out, continually. The closest proximity to a rich vein in an adjacent working can afford no certain assurance that the labour of the adventurer will be similarly rewarded. I may give your lordship some idea of the value of this deposit however, when hit upon, by stating that I witnessed, during my visit, the washing of two thin dishes of this clay, of about twenty inches in diameter, the yield of which was no less than eight pounds' weight of pure gold; and I have seen two or at most three cubic inches of the same yield four ounces.

DESCRIPTION OF BALLARAT, by WILLIAM HOWITT.

(From 'Land, Labour, and Gold.')

Ballarat, 20th May, 1854.

After all the accounts which I had seen of the Ballarat diggings, I had no idea of what sort of place it really was. On approaching it, instead of traversing, as usual, long gullies filled with great heaps of gravel and quantities of tents, I found myself standing on a green bank, near the Commissioner's camp, and before me lying a deep basin, which had evidently been sometime a great lake. This basin, the main field of the diggings, is some mile and half wide or so each way. In the bottom of it rises up a chain of low rounded hills, something like the White Hills of Bendigo; and these hills and the slopes all round this great basin were dug up and presented the usual chaos of clay and gravel-heaps.

On the right hand lay, as usual, a golden point, and before me, more centrally, a red hill. A creek, now strong and rapid from the rains, traversed the bottom of the basin in the foreground, coming from the left and running across a little below the camp. On the left the hills rose higher than on the right, and well wooded; and up and over the top of the nearest and loftiest of these hills had been diggings. This hill was called the Black Hill, for no reason that I could discover but that it was green, and the gravel turned up whitish yellow.

The gold had evidently flowed or rather been washed down from its summit through various gullies to the basin, and the diggers had turned up the whole of its different courses. It had lain only about two feet below the surface, and I was told had been one of the richest parts of the digging. Still farther along the same side I could see that flats, gullies, and summits of other hills had been turned up in the same way, and the diggers having exhausted these hills, are following the track of the gold from the feet of the hills across the bottom of the basin, and there the sinkings are deep—I understand eighty feet or more.

To the left hand side of this great basin runs up, towards the woodland country beyond, the celebrated Eureka Gully, and to the right hand and hidden by a point of land, the equally celebrated Canadian Gully. Out of these gullies have been taken the monster nuggets which have made so much sensation, the largest being found in deserted holes in the Canadian Gully.

No diggings that I have seen—and I have seen all of any importance—lie so compact as these of Ballarat. They are all comprised in this one basin under your eye, and the two arms, as it were, of Eureka and Canadian Gully. Beyond extends the belt of the unbroken forest, with the two conspicuous hills of Warreneep on the left, and Mount Buninyong on the right, looking out of it, as you stand with your back to the Commissioner's camp.

On exploring the diggings, we find Canadian Gully running two miles, or more, away to the right of the Geelong road. The greater part of this gully now lies deserted—worked out; being obviously the scene of the first great rush to Ballarat. The greater part of these excavations had been shallow ones, though here and there a wooden windlass or two shows that the diggers are now turning up a deeper bottom.

But the deep leads of gold evidently tended towards the main basin; and it was here, at the foot and on the sides of the Red Hill, that the diggers of Canadian Gully were busily at work, putting down shafts at from 130 to 166 feet. In the Eureka Gully the scene was the same. The rush was towards the great basin, and occupied chiefly the gully just behind the chain of low hills which run across the middle of the basin. Still nearer to the camp a vein of gold had been traced from a hill on which the Catholic chapel stood, and had run down into the bottom near the right-hand corner of the basin, below the camp, whither the diggers were rushing like a swarm of bees. This was called the Gravel Pit Lead, but might with more propriety have been called the Mud Hole, for a more astounding scene of mud, muddy water, muddy diggers, muddy tools, and clay, trodden into the most vilely adhesive filth, it is impossible to conceive.

III.—NORTH AUSTRALIA,

(RECENTLY NAMED IN PART QUEENSLAND.)

THE FITZROY GOLD FIELD.

(From the 'Sydney Herald,' Oct., 1858.)

The public of Sydney has been thoroughly excited, and the popular impression that a gold-field of great productiveness exists at the north has proved too strong for any counteraction by the press, or by the more stable portions of society. How this gold field fever arose, and by what means it has continued to prevail, is involved in mystery.

The town of Rockhampton—the point to which this emigration is at present directed—is about thirty miles from Keppel Bay, the mouth of the Fitzroy River. It is about 900 miles from Sydney, and 1,500 miles from Melbourne. The gold-field of Canoona is described by Captain O'Connell, the Government Resident at Port Curtis, as being in the county of Livingstone, on the north bank of the Fitzroy River. Rockhampton, prior to the discovery of gold, consisted of only one public-house, a store, and four huts. Gladstone, on the coast, 180 miles nearer to Sydney, has been hitherto understood to be the chief town of Port Curtis.

* * * * * *

The first announcement of the discovery communicated to the public was from a correspondent residing at Moreton Bay, in a letter dated 19th August. It, however, contained no particulars—merely stating that residents lately arrived from the gold-diggings had declared that there was no mistake as to their richness. A letter was addressed to a mercantile firm in this town which gave no particulars, but said, "There is no mistake. You must give credit to what I state, that this must be the best diggings in the colony." Several letters were received from persons whose names were given. These letters ranged from the 13th to the 21st of August. At Gladstone the population left the settlement, and none remained behind but the women and children. The following extract from a despatch addressed by Captain O'Connell to the Minister for Lands and Public Works, was handed to this journal for publication:—

58-37. Gladstone, September 7th, 1858.

SIR,—1. As the sailing of the Uncle Tom this day presents the first opportunity which has offered of communicating with Sydney since my return to Gladstone, I have the honour on this occasion to report to you, for the information of the Honourable the Secretary for Lands and Public Works, that I find the progress made, both in population and yield of gold, on the Canoona gold-fields since their discovery, to be such as to warrant their being admitted amongst the recognised gold-fields of the colony, and to necessitate the adoption of those measures of protection and police contemplated in such case by the Gold fields' Management Act of 1857.

2. I am enabled to state, although not as yet from personal observation, that there are about 300 persons engaged on the Canoona diggings, and that instances of great individual success in obtaining gold are reported, two persons having last week, in two days, washed out 17 ozs. of the precious metal.

3. I believe the quantity of gold sent to Sydney up to the present moment to be about 80 ozs., but there is not much disposition on the part of the diggers to sell their gold until the value of the Mint is ascertained—and therefore the great bulk of that obtained is held by the finders, and is said in the aggregate to be as large a yield as has been procured in the colony.

* * * * * *

I have the honour, &c.
M. C. O'Connell, G.C.

The arrival of the City of Sydney, on the 4th October, brought intelligence, including the following official Report, which has proved in the highest degree depressing to those whose expectations were unduly exalted:—

Commissioner O'Connell's Report on the Canoona Gold-Fields to the Honourable the Secretary for Lands and Public Works, &c., &c., Sydney.

Sir,—Having learnt by the *Government Gazette* of the 17th instant my appointment to act under the provisions of the Act of Council, 20 Victoria, No. 29, as a Commissioner on the gold-fields, I presume it is my duty to address to you direct my reports on matters connected with this service.

There have landed here within the last few days upwards of 1,000 people, and of these 700 have gone to the diggings, making, with those who were previously there, about 1,000 persons of all descriptions at Canoona.

It must be remembered, however, that the greater number of the above have only just reached the ground, and cannot yet be said to be at work.

The quantity of gold, therefore, which has as yet been sent down to Sydney can have been produced only by the labour of the first 60 or 100 diggers; and this quantity, as nearly as I can learn, is 400 ounces.

Until within the last two days all the reports I have received, both of individual and aggregate success on these diggings, have been most favourable; and all the original diggers who left their employments in Gladstone to seek for gold at Canoona have remained steadily at work, taking, many of them, their families up to reside with them.

It is now said, however, that the last comers have found all the as yet discovered available ground preoccupied, and, as is asserted, worked out. Nor are they inclined to push out and prospect on that which has not yet been tried.

I have no doubt the continued dry weather has something to do with this, apparently, depreciated estimate of these diggings; but, occurring unfortunately just now, when new arrivals are flocking in, it has created, at any rate for the time, a want of confidence amongst the latter which will most probably cause many to return.

I look with some alarm at the vast numbers who are said to be now on their way hither, as I fear there will be much disappointment and individual distress, more particularly to those who come unprepared to submit to several weeks of delay before the search for gold becomes profitable.

I must mention, in conclusion, that I am very anxious to receive as soon as possible the necessary books and documents, to enable me to register claims and issue miners' rights.—I have, &c.,

M. C. O'CONNELL, C.C.L.

IV.—NEW ZEALAND, TASMANIA, SOUTH AUSTRALIA, WEST AUSTRALIA, &c.

In New Zealand gold was successfully sought for immediately after the discovery of placer-deposit gold in New South Wales, and has been worked to some extent in both the settled islands.

At Coromandel Harbour, near Auckland on the Northern Island, the gold in alluvia is of extraordinary character, being, in fact, a kind of highly auriferous pebbles or stones rather than the ordinary metallic gold in free grains; some of it, however, is purely metallic gold without any admixture of stone, and when so existing it appears remarkably in dendritic forms. No neighbouring auriferous veinstones have hitherto been found, and there yet remains to be solved the deeply interesting question whether or no any veinstone exists there of the character of the auriferous pebbles. These gold-diggings near Auckland have been, for the present, abandoned, not being apparently sufficiently remunerative. The gold-washings which have been commenced on Middle Island are situate on Slate River, near the settlement of Nelson, in Cook's Straits. The produce of these placers in small scale gold is considerable, but in character the metal nowise differs from the ordinary gold of other slate districts.

In Tasmania strenuous efforts have been made by the residents to establish the island as one of the important gold-producing colonies of Australia, but hitherto without success. Placer-deposit gold to some extent undoubtedly exists there, and the auriferous quartz-veins are said to be unusually impregnated with gold in the invisible state. A reward of ten thousand pounds remained long under offer by a local committee for the discovery of a payable gold field, but without effect. The Rev. Mr Clarke being in Tasmania in 1846 for the benefit of his health, reported upon one of its reputed gold-fields, and again, in 1858, received an official invitation to undertake for the Government a systematic geological survey of the whole colony, which, however, on the ground of physical inability, he declined. Several samples of alluvial gold in large grains, exceedingly remarkable for being pointed with platinum, and alleged by the Committee for Gold Discovery in Tasmania to be the natural produce of the island, were lately exhibited to me in Sydney by the Rev. Mr Clarke. West Australia has not yet been proved one of the gold-producing colonies, although occasional rumours of gold-findings do appear in the public journals. The character of its rocks are certainly indicative of gold, although its mountains are in no way connected with the chain of the Cordillera of Eastern Australia. South Australia produces some little gold from a placer near Adelaide, known as "The Echunga Diggings," and a lode of silver lead, to which the name of Wheal Ellen has been given, yields gold from the gossan at its surface. A late exploring expedition from South Australia to the north-west, undertaken by Mr Stuart, discovered a range of mountains near the centre of Australia, which seem likely to prove gold-producing when more explored.

APPENDIX E.

THE INCORPORATED GOLD-MINING ASSOCIATIONS OF NEW SOUTH WALES.

THE public companies organized for extracting gold from veinstones in Australia during the first excitement which followed the placer-deposit gold discovery founded their faith entirely upon the doctrine that visible alluvial gold was in reality merely the insignificant and detached portions of the treasures of which the veinstones were the grand reservoirs. The practical results of this mistaken faith have proved in all the first undertakings to be most disastrous in their consequences to the promoters. The abrasion doctrine is indeed very convenient for share-market purposes, and the voice of experience is uttered in vain while any popular mania prevails. The directors, promoters, and shareholders of these public companies required but one kind of opinion, and that was desired to be always favourable to their wishes. The soundest judgment and the most valuable opinions of a contrary nature (though possibly sometimes mistaken) only exposed those who published them to every sort of obloquy, of which "want of energy," "inanition," and "mere theory," were not the least contemptible terms. The integrity of the more experienced gold-miners deserved in this respect more public consideration and approbation than the press ever acknowledged; even rewards from the Government may be justly regarded as much due to the prudence which prevents an unprofitable waste of national resources as to random and lucky predictions which subsequent events may realize. Adverse opinions honestly given by those sufficiently experienced to frame them correctly, subjected the giver not only to obloquy, but to comparative poverty, for they who, however recklessly, were willing to exalt the expectations of the shareholders of any incorporated quartz-mining company, were rewarded with appointments, with gratuitous shares, and with public adulation, until the ruinous consequences followed (which every prudent man could foresee), when a convenient apology was always ready in the proverbial uncertainty of mining enterprise. The managers of English gold-mining companies, with capital at command, might be seen in those times wandering about the gold-mining districts of the colony in a most pitiable and helpless manner. These persons were truly objects of commiseration, although spending freely the joint-stock funds, and assuming a prodigious superiority over the rough and horny-handed gold-diggers. The great difficulty of such gentlemen was to find the gold-mines or veinstones which they had come out to work by the agency of others, for of course, the self-important managers could not be expected to work like common gold-diggers, while they were nevertheless under the necessity of spending their means with all the prodigality which accompanies the working of gold in placer-deposits.

The bubble companies and others of doubtful integrity of purpose which were initiated in those early days, such as the Segenhoe Gold-mining Co., the Lake Bathurst Gold-mining Co., the Peel River Co., and several others of this class, may be passed over without further remark; but the three following incorporations, which were probably more *bonâ fide* in original expectations, may be here usefully mentioned. The Great Nugget-vein Company, which subsequently amalgamated itself with an English association, called the Colonial Gold-mining Company, made the most persevering endeavours of any of these early associations to extract gold from quartz profitably, but their efforts were unsuccessful; and indeed it was quite apparent to Mr Hargraves and myself, after our first inspection of this veinstone, that the operations of the company would be profitless. The Turon Golden Ridge Quartz-crushing Company, after its organisation, never even erected machinery on the claim, although favoured with the highly-flattering opinion of an experienced gentleman from Mexico, whose services they had been so fortunate (as they said) to secure. This company eventually sold all interest in the mine for a very small sum, without ever having attempted to crush the quartz matrix. The Wentworth Gold Company still drags on a languid existence, and derives some gold from the alluvia, but no distinct gold-bearing veinstone has yet been found on the property, the field having proved to be precisely what it appeared to Mr Hargraves and myself on our first inspection of it—namely, a very rich but limited placer-deposit of gold, notwithstanding Mr Stutchbury's opinion to the contrary. Since these abortive attempts, co-operative associations, and even incorporations of capitalists (the Port Phillip Gold-mining Company for instance), have in Victoria worked the richer gold-bearing quartz-veins with moderate success. The proceedings of the earlier associations above mentioned having now become matter of history, the exaggerations and embellishments of their prospectuses may here be presented to the reader, to whom they will probably appear as extravagant as they did at the time of their issue to the more experienced gold-miners. These were published as follows:

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1. THE GREAT NUGGET VEIN GOLD-MINING COMPANY OF AUSTRALIA. CAPITAL, 200,000*l.* (1852).—The quartz and alluvial gold-field, comprised in the claims of the Great Nugget Vein Gold-Mining Company, is situate on the Louisa Creek, twenty-nine miles from the town of Mudgee. Its superficial area may be computed at upwards of two miles in length, by a width of nearly half a mile; the exclusive right of working for gold in and over which has been transferred, under the regulations of the Colonial Government, to the Company.

At an early period after the discovery of the precious metals in the colony of New South Wales, a brilliant series of specimens of gold in the matrix, of extraordinary richness, together with a large amount of alluvial gold, forwarded in rapid succession to Sydney from "The Great Nugget Vein," stamped the Company's claims as, perhaps, the richest of the auriferous lands of New South Wales;—whilst more recent explorations have developed, in the vein itself, an apparently exhaustless deposit of mineral wealth, which fairly entitles it to the designation of the Burra Burra of gold mines.

It was from out this vein that the mass of gold in the matrix, discovered by (a black fellow in the service of) Dr Kerr, was taken. This specimen, yielding upwards of 106 lbs. of pure gold, was sold by the discoverer to Messrs Thacker and Co., of Sydney. It was consigned by them to their London correspondents, Messrs Jardine, Mathieson, and Co., by whom it was exhibited generally among the London merchants. This discovery was speedily followed by the transmission to Sydney of two other splendid specimens, the one being gold in quartz, weighing 90 oz., and the other a solid lump of pure gold, weighing 82 ounces. Whilst among subsequent discoveries may be mentioned "Brennan's lump," upwards of 28 lbs., sold by auction in Sydney, to Messrs Holt and Lloyd, for 1,155*l.*, and the still more recent extraction of the "King of the water-worn nuggets," weighing 157 ounces.

A knowledge of these rich returns as the result of operations conducted chiefly by manual labour induced the formation of the present Company.

In the absence of skilled labour and adequate machinery, and with the exorbitant rate of wages and the high value of capital in the colony, it seemed practicable to select and purchase quartz claims of established value with considerable benefit to a company though at a necessarily high price. After careful examination, therefore, into the quantity of gold which the mere *surface* of the nugget vein had yielded, and of the extensive field which it presented for the operation of extended means, the Company entered into negociation with the proprietors of the Great Nugget Vein. Under the conviction that a partial interest, to be retained by them in their claims under the management of a Company, would be more beneficial than they could hope to render them by the limited operations within their power as private individuals, the proprietors proposed to vest their entire claims in a Company on conditions which required—A capital of 200,000*l.*, to be represented by 100,000 shares of 2*l.* each. A reservation of one-third of such shares (to be considered as paid up), together with 5 per cent. on all gold raised; a right to purchase ten thousand additional shares on the same terms as the public; and the nomination of one of the three Trustees and three of the six Directors of the Company.

After a discussion of this proposal at a public meeting of intending shareholders, it was deemed sufficiently beneficial to accept it; and a contract, securing to the Company the right of working these claims, was concluded upon the conditions stipulated for.

The purchase thus conducted comprised whatever improvements had been made by the proprietors. These consist of buildings affording a residence for superintendents, and accommodating from 80 to 160 workmen, with stabling, sheds, and various workshops and outbuildings, a steam engine of six-horse power for experimental purposes, with other machinery for operating upon the alluvial soils.

The proposed operations of the Company are the extraction of ore by the two processes now used in the colony, viz., the mining of auriferous quartz-veins, and the washing of alluvial deposits for gold. It is also proposed to authorise the purchase of gold by the Company's agents, whenever the same can be done at remunerative prices.

To carry out these objects, persons possessed of adequate mining knowledge and experience will be engaged on behalf of the Company; and machinery, the best adapted for crushing the auriferous quartz, and extracting the gold from the alluvial soil, will be imported.

It is intended to take all necessary steps for limiting the liability of shareholders to the amount of their paid-up shares; and should it be found necessary, a charter will be applied for.

It is proposed that one-third of the shares shall be reserved for sale in London, for the benefit of the Company. The one-third for the colony will be allotted among the applicants by the Board of Directors.

The Colonial Gold-Mining Company, an English Association, subsequently took upon a sub-lease the mineral claims of the Great Nugget Company, the practical working being now placed under the management of Mr E. J. Spence, who had negotiated the terms of transfer, and now erected quartz-crushing machinery on the claims of the Great Nugget Company. Under another manager, the same Gold-Mining Incorporation of English capitalists conducted extensive quartz-mining works in Victoria; its affairs were finally wound up in consequence of the Report of a Committee of Investigation appointed in London. At a meeting of the shareholders, at the London Tavern, in 1856, Lord Alfred Churchill presiding, the Chairman, after reading the Report, said: "He thought there had been very reckless expenditure, and he could not discover that there was ever any source of profit. The manager in Victoria had expended upwards of 40,000*l.* previous to this last call, whilst the whole amount of the gold which had been obtained from Victoria was 701 ounces, in the year 1854, since which there had been no return at all, and the establishment was now closed. In New South Wales the expenses had been just double the value of the gold obtained. The expenses of home management also seemed to be excessive. The Directors had run through a capital of 100,000*l.*, and now made a call for 12,000*l.* more. It was for the shareholders to say what should be done."

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2. Prospectus of a Company, to be called the "Wentworth Gold-Field Company," at Frederick's Valley, known at present as the Wentworth Diggings. (1852.)

Experience having shown that the gold-fields in this locality cannot be worked on a large scale, and to the utmost advantage, without machinery to crush the ore, and quicksilver to amalgamate the fine gold dust, which in the ordinary process of washing escapes in great quantities from the cradles, the proprietor (in order to raise the necessary capital, and to comply with the numerous applications which have been made to him for shares in a company to be formed for this purpose), is willing to dispose of that portion of his estate at Frederick's Valley, consisting of 1,033 acres, which comprise the gold-field, on the following conditions:

1st.—There shall be a capital subscribed of 30,000*l.*, in 3,000 shares of 10*l.* each, 25,000*l.* of which shall go to the proprietor for the absolute purchase of this land, and the remaining 5,000*l.* shall form the working capital of the intended company.

2nd.—The proprietor reserves a right to take 1,000 of these shares on the same terms as other subscribers, so that only 2,000 shares will be open to the public.

3rd.—If these shares are not taken in a reasonable time (say *two months* from this date) it shall be at the option of the proprietor to return the money to the subscribers, and so put an end to the intended company.

4th.—All money paid for deposits on shares will in the meanwhile be paid into the Bank of New South Wales, to an account to be opened there in the names of the gentlemen who have consented to act as trustees between the subscribers and the proprietor.

5th.—As soon as all the shares are subscribed, the land will be conveyed to such trustees as a majority of the subscribers may select from their body, and the money at the account of the trustees (except the working capital of 5,000*l.*) shall be paid over to the proprietor on the execution of the conveyance.

6th.—Subscribers will have in the first instance to sign a share list, with the number of shares they are desirous of taking placed opposite to their names, and to pay upon each share (under five in number) a deposit of 2*l.* (two), and above that number a deposit of 1*l.* (one). When the share list is complete, the subscribers will be called upon to take up their shares, and to pay the balance of their subscriptions.

As soon as the shares are all taken, a public meeting of the subscribers will be called to settle the terms of the deed of co-partnership, elect directors, and take the necessary measures for bringing the company into operation. An application will also be made to the Legislative Council for an Act to limit the liability of the shareholders to the working capital to be subscribed.

Samples of the gold and gold ore may be seen at the shop of Mr Hale, jeweller, George street, and a map of the gold-fields at Messrs Purkis and Lambert's.

The title to the land is a grant by purchase from the Crown to the present proprietor, which will be conveyed to the company free from encumbrance.

Messrs Purkis and Lambert, in reference to the foregoing prospectus, beg to state that the average earnings of Mr Wentworth's tenants during the short period they were permitted to dig at Frederick's Valley, exceeded those of any other diggings yet discovered in the colony, and that no one has been allowed to dig there since the 1st of September last (on which day the licenses of the tenants terminated) except a party of four having a quicksilver machine, who accidentally hit upon a lode, from which, in the course of about one day, a single digger raised at least 500*l.*'s worth of gold ore and earth, the earth of the lode or vein averaging about 25 per cent. of pure gold. From this lode the amalgamated and retorted specimen weighing 3lbs. 10¼oz., now exhibited at Mr Hale's window, in George street, was obtained. Nevertheless the working of the quicksilver machine which produced this splendid result was so incomplete, that the tailings of the machine have been since found to contain very considerable quantities of gold, which escaped from the machine unperceived by those who worked it.

Messrs Purkis and Lambert beg further to add that this golden lode was closed up immediately after its discovery, and has been ever since carefully watched by trustworthy persons, both by day and night.

Extract from a letter addressed by the Geological and Mineralogical Surveyor to the Honourable the Colonial Secretary, dated Orange, 23rd June, 1851, showing that Mr Stutchbury predicted the existence of lodes such as that which has been recently discovered before the locality was worked.

"Upon the land belonging to Mr Wentworth, close upon the south side, or within the fork where the Gosling Creek forms a junction with the Frederick's Valley Creek, upon a range fifty or sixty feet above the valley, gold has been picked up from the surface of the ground, principally in fragmentary quartz, and an ochreous loam.

"This gold cannot have been removed far from the rock in which it originated, as it does not resemble the usual water-worn character. That its original site is in a quartz rock immediately adjacent is evident from the unabrased appearance of the gold, and the sharp angular state of the quartz.

"Quarrying into the body of the rock would most probably exhibit the gold in veins.

"The fact of its being found on the summit of the hills, in or near its original matrix, is very important; further examination in similar situations may prove its occurrence in regular lodes or veins like the baser metals."

Extract from a letter dated 7th October, 1851, from Mr William Russell, who has the experience acquired by mining in California, to his brother, Mr Peter Russell, of the Sydney Foundry: "If you can enter into any arrangement with Mr Wentworth, do so—say half the gold, but not more; I can't say all the ground is as good (in fact I am sure it is not), but still, from its being matrix gold, you may strike upon tons of it. Before entering upon quartz speculation I would advise you to come and see. I think, or rather have never seen any like the Wentworth diggings—gold like siftings in flour. A princely fortune lies in either the purchaser or the first authorised company. I want to ascertain all about it, and send you a specimen of stone containing gold; to my calculation a ton of the same as I send you would yield from 200*l*. to 300*l*."

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3. THE TURON GOLDEN RIDGE QUARTZ-CRUSHING COMPANY.

(PROSPECTUS, 1852.)—Three months ago a company was formed in Sydney for the purpose, amongst others, of purchasing and working a rich quartz-vein discovered in the neighbourhood of the Lower Turon. Arrangements were at once made for dispatching competent persons to ascertain and report on the richness of the claim. These reports were sufficiently satisfactory to induce the Provisional Committee to conclude on their own responsibility the negociation then on foot with the original claimants, and the vein became duly transferred to, and is now held by, trustees on behalf of this company, which was originally composed of a few individuals, under the impression that a limited capital would be sufficient to work the mine. A deed of settlement, as prepared by the solicitors of the company, was submitted to a general meeting of the shareholders, adopted and signed, appointing the abovenamed gentlemen first directors of the company.

It is unnecessary to enter into detail respecting the subsequent acts of the directors. Suffice it to say that every week has added to the evidence they possessed of the amazing richness of this mine. Portions of the quartz, selected indiscriminately from the ridge, having been forwarded to Sydney and tested by practical assayers, have yielded gold to an extent which has not only startled the directors, but which, if published, would scarcely be credited.

Independently of the facts brought under the directors' notice by their own experiments, disinterested parties have spoken of this claim in the highest terms, and the Assistant Gold Commissioner gives his opinion of its value in the strongest language, in his original report on the subject to the Chief Gold Commissioner.

In the early part of last month the directors were fortunate enough to secure the services of a gentleman lately arrived from Mexico, where he had been engaged for many years in mining pursuits, with whom they entered into an arrangement to proceed to the Turon, survey and report on the auriferous quartz-vein on the company's claim, and the best mode of working the same. This gentleman has returned to town, and his report fully confirms previous statements. He excavated nine feet, and quarried out a block of quartz so large that it cannot in the present state of the roads be conveyed to Sydney, bearing indications of gold as rich as previous samples, which yielded at the rate of 1,400*l.* sterling per ton. The character of the quartz upon this claim is of the best description, being thoroughly impregnated with gold, and so equally distributed as to be perceptible to the naked eye on all sides, but when brought under the influence of a powerful lens, it is found to pervade the whole mass. From the report of this gentleman, and information obtained at frequent interviews, the directors have satisfied themselves the present capital of the company is not sufficient for the proper working of this mine; and as they have been frequently applied to for shares, which they could not supply, a meeting of the company was held at the Royal Hotel on Thursday, the 23rd instant,

When it was resolved—

"To increase the capital of the company to 40,000 shares of 20*s.* each, and to offer 20,000 shares to the public for sale; such offer only to remain open one month, at the expiration of which the shares unapplied for to be appropriated as the directors may decide."

In accordance with the above resolution, the public are invited to apply for any portion of the 20,000 shares now offered for sale.

The declared objects of the company are—1. To extract gold from quartz-veins; 2. to work alluvial soil; 3. to purchase gold. Towards the first of these objects they possess the rich vein already alluded to, and have the first claim to two others adjoining, making in all one mile and a half of quartz.

The second of these objects is not engaging their attention at present.

The third object they are already acting upon, so that the capital of the company may never be unproductive.

Application is being made to the Legislative Council for an Act to limit the liability of the shareholders.

It will be seen by the above that the directors are quite alive to the importance of employing the capital of the company, at the same time fully resolved to expend it judiciously and economically. Further particulars may be ascertained from any of the directors, and parties desirous of obtaining shares are requested to make early application; they will be required to pay a deposit of 5*s.* per share as soon as the shares are allotted, and the balance whenever the calls are made.

APPENDIX F.

GOVERNMENT REGULATIONS FOR GOLD-MINING.

THE first proclamation, asserting the rights of the Crown to the newly-discovered gold deposits in Australia, was immediately followed by the issue of temporary regulations and appointments of local gold Commissions with Mr John Richard Hardy as commissioner-in-chief, and several subordinate district commissioners. The regulations of the 2nd of February, 1853, issued some time subsequently, is the most complete code of regulations promulgated in the colony; and although since much modified in practice, it continues to be the foundation of succeeding regulations. The provisions for alluvial washings were twenty feet frontage claims on either side of a river to each miner; or secondly, twenty feet of a tributary to a river extending across its whole breadth; or thirdly, sixty feet of the bed of a ravine or water-course; or fourthly, twenty feet square of table land or river flats. A licence fee of thirty shillings a month to be paid by each miner. Larger auriferous tracts to be conceded to companies on special leases, and the quartz matrix claims to consist of half a mile each in the course of the vein, with an average breadth of a quarter of a mile on each side reserved for building and other necessary purposes. Application fees of 50*l.* for each quartz-matrix claim were to be paid in the first year, and the royalty, in lieu of a monthly licence fee, to be ten per cent. on all gold produced. The duration of the lease to be twenty-one years, and sureties to be given for the due payment of royalty, and twenty persons, or an equivalent in horses and machinery, to be employed within twelve months from the date of notification of acceptance of application. The royalty was soon afterwards reduced to three per cent., at which rate it has since remained. After reduction of the licence fee for independent gold-digging to ten shillings per month, finally a document called the *Miners' Right*, which required only a payment of 1*l.* per annum, entirely superseded the system of licences.

Subsequent Acts of the local Parliaments in Victoria and in New South Wales have authorised the enactment of regulations still more local by Mining Boards on the various gold-diggings, and these rules have all the force of law on receiving the subsequent approval of the respective Legislatures and Governors. The local regulations consequently now differ from each other very materially, and according to the nature of the gold deposits in each district. In this respect the Californian custom has predominated over all injudicious attempts of the Governments and class legislatures to impose arbitrary and impracticable regulations upon the gold-mining community, a class which long remained entirely unrepresented in the local Parliaments. The annexed account of the mining regulations of a former period in Brazil, printed in official papers in the colony, reveals the gradual relaxation in that country of the Crown authority in the granting of mining ground, and the inevitable necessity arising from the nature of the pursuit of transferring to the gold-diggers considerable power in the regulation of their own mining affairs. The inadmission of the public to mine for gold on private lands and the right of gold-miners to depasture their working animals upon public lands without the intervention of privileged graziers or squatters, although grievances often agitated of late in the colonies, seem to have been in Brazil always regarded as the admitted privileges of the gold-mining community. The question of the right of gold miners to search and work for gold upon private lands had been contested in similar manner in California, several serious encounters having occurred in consequence, and it was there at length settled in the same way as in Brazil, namely, that the gold as a treasure-trove belonged to the finders, who, besides paying the ordinary royalties, were only held bound to indemnify the landed proprietors for any loss in crops or other damage that might, in consequence of the gold-diggers, be sustained by them.

The progressive phases of gold-washing appear also to have been the same in Brazil as latterly in California, and still more recently in Australia;—thus, at the first opening of gold-deposits, the washing-stuff is carried to the water to be cradled or dish-washed—the contention among the miners then being for the possession of rich mining claims; the next change occurs when the water is conducted to the auriferous ground to work long-toms and sluices, when the struggle is for the possession of water privileges. These changes have not always occurred in consequence of ignorance in the art of gold-washing, but rather because such is the natural order of things that the general body of gold-miners at the first opening of very rich placer-deposits will not allow of any monopoly of water privileges so long as the earth remains very prolific of gold, but after the first richness becomes reduced the necessity of such appropriations is universally acknowledged, and then the exclusive rights are permitted.

The following extracts on Gold-mining Operations are taken from 'Southey's History of Brazil:'

First Code (A.D. 1618).—"Any person who adventured to discover a mine was to give notice to the *Provedor* whom the king appointed in those parts, and bind himself to pay the royal fifths; his declaration was to be registered and signed by himself. After these preliminaries had been observed, all persons in authority were bound to afford him the necessary assistance; and when he should have succeeded in his search, the time and place of the discovery were to be entered with all proper particulars in the same book. He was to present a sample of the metal to the Provedor within thirty days after the discovery, and make oath that it had been extracted from the place which was registered on his account. If it should afterwards be proved that he had sworn falsely, he was amenable for all the expenses which other persons might incur by working at that place, in consequence of his deceit, and to be punished also; and if the manifestation were delayed beyond the time appointed, unless a sufficient reason could be adduced for the delay, his privileges as a discoverer were forfeited.

"The privileges of the discoverer were that he should have one mine, as it was then called, of eighty Portuguese *varas* by forty allotted him (the *vara* is about one and a sixth English linear yard); and a second allotment of sixty by thirty upon the same *beta* or vein; both were to be his own choice, but an hundred and twenty *varas*, being the space which two such smaller grants would occupy, were to intervene between his two portions. . . . Any adventurer might demand a mine, but he could only have one which was to be of the same extent as the discoverer's first portion. . . . An adventurer might seek and work a mine upon private property, because it was for the king's service; but he was bound to indemnify the owner of the land for any injury which might be sustained.

"In order that the mines might prosper, and that *Engenhos* (inns) and dwelling-houses might be erected in the mining country, adventurers were admitted to all common rights of the district. They might turn their cattle into the lands of the *Conselho*, upon the public ground, and even upon private estates, if it were necessary; in this case they were to pay the value of the pasturage, but the owner had no power to forbid them."

SECOND CODE (A.D.1702.)—"It was found necessary to alter the existing laws. A greedy desire of gain induced men of influence to solicit so many grants that none were left for poor adventurers;—the former code seems therefore to have been disregarded, or to have fallen into disuse; these men of influence had not means for working the numerous grants which they monopolized, so they sold them to those whom they had forestalled, or let them lie unopened, in the first case, to the injury of the people, and, in the second, to the detriment of the revenue. Therefore it was enacted that no second grant should be made to any person till he had worked the first; and if ground were still remaining, after all the adventurers had received their allotments, it should be apportioned amongst those who possessed more than twelve slaves, a certain quantity being allowed for every additional head. On the other hand, when there were more claimants than could find shares in the extent of ground upon the scale prescribed, the proportions were to be lessened, that all might be satisfied, as well the poor as the powerful,—though it should be necessary, said the law, to measure the ground by spans instead of fathoms. The allotments were now regulated by the number of slaves which the miner employed, in the ratio of two *bracas* and a half (about fifteen feet) for each. Besides its fifth, the Crown took to itself an allotment, to be marked out in the best place, after the discoverer had taken his first grant, and before he had chosen his second."

A.D., 1724.—"The method of mining had now undergone a considerable alteration, introduced by some natives of the mother country. Instead of opening *catas*, or searching places by hand, and carrying the *cascalho* (washing-stuff) from thence to the water, they conducted water to the mining-ground, and washing away the mould, broke up the cascalho in pits under a fall of the water, or exposed it to the same action in wooden troughs. A great expense of human labour was thus spared; but as soon as the advantage was well understood, the Poderosos (sluice-washers) took possession of the water-courses and directed them to their own grants. Persons of less influence were then obliged either to purchase water from these great men at an exorbitant rate, or pursue the old manner of working. There are many things in which the Brazilian manners resemble the worst parts of the feudal system; but in the mines there had been no time for manorial rights of this nature to be established, and the attempt to arrogate them became a more frequent cause of disputes and litigation than any other grievance."

THIRD CODE (A.D. 1730).—"But every fresh discovery endangered the authority of the laws, for now when Minas Geraes was perhaps more populous than most of the other captaincies, such multitudes flocked wherever gold was newly found, that it was no longer possible to observe the old regulations concerning grants; and the Government found it expedient to yield an authority which could not be maintained. The concession was made in time and in such a manner as to appear an act of grace rather than of necessity. Great crowds had assembled in a new discovery at the Morro de St Vincente, upon the Rio dos Pedras, one intruding upon the ground which another had appropriated, so that, instead of extracting gold, all were engaged in tumult and contention. The Governor, therefore, proclaimed that the ground here should be common to all the people, and that no grants should be made, only a certain distance was to be left between the openings. The Camara of St Joam d' El Roi represented that a few individuals claimed to themselves the whole hill at Rio dos Mortes, and the people, because they had no mining ground whatever, were deserting the town. In a case of this kind there was no time for a reference to the Home Government. Don Lourenço therefore gave notice that no man should appropriate more ground than his legal proportion, according to the number of slaves whom he employed, and as the hill was of great extent, there was room enough, he said, for the negroes of the inhabitants to mine and search for gold without interfering with the works of those who had brought water to the ground, for, he added, it had always been the custom in these towns that the adjoining hills should be common gathering places for all the inhabitants. Here the grasping disposition of a few *Poderosos* had provoked resistance; but six years afterwards, when the Marro de Cattas Altas was opened, the people demanded that it should be declared common property, free for all to work who chose; and it was proclaimed accordingly that no person should appropriate ground to himself under any title, but that all might take the benefit of it, and employ their slaves there."

Extract from Robertson's 'History of America,' relating to the Gold and Silver Mines' Regulations of New Spain and Peru.

"In order to encourage private adventurers, the person who discovers and works a new vein is entitled to the property of it. Upon laying his claim to such a discovery before the Governor of the province, a certain extent of land is measured off and a certain number of Indians allotted him, under the obligation of his opening the mine within a limited time, and of his paying the customary duty to the king for what it shall produce. Invited by the facility with which such grants are obtained and encouraged by some striking examples of success in this line of adventure, not only the sanguine and the bold, but the timid and diffident enter upon it with astonishing ardour. With vast objects always in view, fed continually with hope, and expecting every moment that fortune will unveil her secret stores and give up the wealth which they contain to their wishes, they deem every other occupation insipid and uninteresting. The charms of this pursuit, like the rage for deep play, are so bewitching, and take such full possession of the mind as even to give a new vent to the natural temper. Under its influence the cautious become enterprising and the covetous profuse. Such is the spirit that must be formed wherever the active exertions of any society are chiefly employed in working mines of gold and silver. . . . In comparison with the precious metals every bounty of nature is so much despised, that this extravagant idea of their value has mingled with the idiom of language in America, and the Spaniards settled there denominate a country *rich*, not from the fertility of its soil, the abundance of its crops, or the exuberance of its pastures, but on account of the minerals which its mountains contain. In quest of these, they abandon the delightful plains of Peru and Mexico, and resort to barren and uncomfortable regions, where they have built some of the largest towns which they possess in the New World. As the activity and enterprise of the Spaniards originally took this direction, it is now so difficult to bend them a different way, that, although from various causes the gain of working mines is much decreased, the fascination continues, and almost every person who takes any active part in the commerce of New Spain or Peru is still engaged in some adventure of this kind."

The following observations of the 'Melbourne Argus' in 1858 explain the latest general Regulations for Quartz-mining in Victoria:

"The conditions on which mining operations are conducted have long proved unsatisfactory to a considerable section of the digging community. Quartz-mining has to a large extent superseded the more simple processes of alluvial digging; and to carry this on with any degree of success not only is costly machinery required, but the results have to be long and patiently waited for. The necessity for capital is thus created—and capital must be looked for in quarters outside the ranks of the working miners. One essential condition must be established before the investment of capital can be expected—viz., a certain fixity of tenure. The attention of Government has been long directed to the task of framing a series of regulations by which this condition should be secured, by means of leases of auriferous land, and by which, at the same time, the unmoneyed digger should be protected from dispossession of the auriferous ground he has occupied.

"The subject of mining partnerships or associations is closely identified with that of leases, and its settlement has been found to involve quite as many practical difficulties. The miners, as a body, are disinclined to accept the condition of hired servants, whilst the capitalist, on the other hand, would find his investment fruitless without the assistance of the experience and skill of the practical digger.

"The Mining Association Bill of last session authorised the Governor in Council in effect to issue regulations on the subject of partnership for mining pursuits, by prescribing a model form of instrument of association. This document was gazetted on Friday last. According to its provisions mining associations may comprise property partners, labour partners, and money partners—the first to consist of the owners of such unworked quartz and plant as they may already have placed on the ground, which they seek the assistance of the capitalist to work; the second class, of persons who take up shares, the value of which they undertake to pay for by labour for the company; and the third, of course, of investors simply. There are to be no powers of borrowing, but preferent capital shares are to be issued if extra money resources are required, which are to constitute a primary charge upon the general stock. The model instrument embodying these general provisions, and others connected with the working of an extensive partnership, consists of numerous clauses, of which each company is to be at liberty to adopt as many as it pleases, provided that no other conditions are adopted inconsistent with its general scope."

APPENDIX G.

POLITICAL DISAFFECTION OF THE GOLD DIGGERS ON THE TURON, AND THE REBELLION AT BALLARAT.

These historical incidents, owing to the important changes in the political constitution which immediately followed them, deserve more than a passing remark. The licence fee of thirty shillings a month demanded in advance from all persons on the gold-fields—the objectionable military method employed to collect it, and the total absence of direct representation of the gold-digging community in the Legislature, with the resulting evils of class legislation (in class interests daily becoming more antagonistic to each other), had long been regarded by the gold-miners as intolerable grievances. An oligarchy and a democracy now struggled, in fact, to secure each to itself exclusive benefits in a common treasure-trove, as well as to obtain political rights or party advantages. The gold-diggers and the squatters were at this time the rival occupants of Crown lands, of whom the latter only were represented in the legislative assemblies. The gold-diggers and the landed proprietors now appeared likewise as equal claimants to gold deposits on private lands; while the latter only, by virtue of previously-conceded political position, possessed the legal right of framing laws exclusively for their own benefit—a right too often exercised only to the prejudice of their virtual benefactors, the gold-miners. The gold-diggers' remonstrances at length culminated in open disaffection, first at monster meetings, with armed demonstrations at Sofala, in New South Wales, and afterwards more decisively and effectually in declared rebellion to authority at Ballarat. The threatened outbreak on the Turon was fortunately averted by temporising conduct on the part of the Local Gold Commissioners, the popular feeling at the gold-mines remaining nevertheless intensely excited until events in Victoria had caused a radical change in the management of the gold-fields, and the policy of the Government towards the gold-miners.

The more immediate causes of the Ballarat Rebellion were—*First*, the suspected corruption of the government officials in liberating from custody a notorious and wealthy hotel-keeper, accused and apparently—in public estimation of the evidence adduced at the first examination before the Gold Commissioners—guilty of an atrocious robbery and murder of a gold-digger (one amongst several who had mysteriously disappeared) near Bentley's Hotel. The gold-diggers assembled tumultuously, and somewhat after the manner of Lynch law proceedings, burnt Bentley's Hotel to the ground. In California the Vigilance Committees, or voluntary associations for public safety, had been organised to check the corruption of public functionaries on one hand, and mob violence of this kind on the other; but in Victoria no popular control suited to the wants of a gold-digging encampment had ever been recognised as a legitimate power. The second more immediate provocation to rebellion was an unusually ferocious digger-hunt, undertaken by certain government officials to compel payment of licence fees. A monster meeting of gold-diggers at Ballarat was then held, which resolved to commit existing licences to the flames, and to refuse payment of licence fees in future. Preparations for resistance by armed force now commenced on both sides. The fearful nature of the crisis, and the catastrophe of the attack on the gold-diggers, are duly recorded in the local journals of the time. In the State trials which followed the revolt, the government prosecution failed to convict any of the insurgents, and their leader, Mr Peter Lalor, then addressed his fellow-colonists in justification of the motives and conduct of his comrades in arms, and "to snatch from oblivion the names of his brave companions who fell on the eventful morning of the 3rd of December." The urgent appeal of the Governor to the citizens of Melbourne and Geelong to enrol themselves in arms to support the government had been received with a coolness which virtually amounted to a refusal. For a few days martial law was proclaimed at the diggings. Mr Peter Lalor almost immediately afterwards was appointed to a seat in the Legislature by the Governor's nomination until constitutional provisions could be made for the admission of gold-miners' representatives into the Legislative Assembly, when subsequently the gold-diggers returned him by acclamation. The Colonial Secretary had been ignominiously dismissed from office, or to use the more courteous expression, he had resigned, under defeat; and the most solemn pledges being then given by the Governor, Sir Charles Hotham, to redress the hitherto disregarded grievances of the gold-diggers, a strife was happily terminated which, if otherwise prolonged, might possibly have ended with the misfortune of a lasting separation of the colonies from Imperial control.

The memorable attack of the troops and police upon a small number of gold-diggers occurred on Sunday morning, the 3rd of December, 1854. It is thus described in one of the public prints: "The officers and men attached to the government camp, after having fortified their position in as strong a manner as the time would allow, had remained closely ensconced behind their entrenchments. On that day, however, having received intelligence that the main body of the insurgents (as they now appear to be called) had started off to intercept the advance of the anticipated reinforcements of military from Melbourne, the authorities of the camp determined upon taking the camp of the diggers by surprise; and consequently, a short time before daybreak, the troops and police were under arms, and just at the first blush of dawn they marched upon the camp at Eureka. The attack upon the Government Camp had been so frequently spoken of that the officials determined to forestal any such attempt, and to take the initiative. From inquiries we have made, we are led to believe that this threat of an attack upon the camp is one of the many fabrications that have helped on the present entanglement.

"At daylight, rather more than three hundred men, military and police, marched upon the Eureka camp, the military forming the centre, and the troopers and police the two wings. The police on the right and left of the main body of soldiers were enabled, under the heavy fire kept up, to surround or rather to outflank those who defended the insurgent position; the severe fire maintained by the troops soon obliged the diggers to withdraw from before it; and as they retreated they were pounced upon by the police, who had covered the flank and rear of their position. In this way the discomfiture of the insurgents was most complete. It was reckoned that there were about two hundred and fifty men in the camp when attacked; and, when we reckon about twenty killed, one hundred and twenty-five prisoners, and perhaps three times as many wounded as killed, it will be found that only a very few of the number holding the camp can have escaped altogether.

"On the two preceding days, during the skirmishes that had ensued between the diggers and the police, the diggers had appeared to have rather the better of the work, and this more than aught else induced the authorities to strike a heavy blow, not only to prevent the organisation that was going on, but to retrieve their lost honours before the arrival of reinforcements took the chance out of their hands."

The complaints and proceedings of the revolted gold-diggers appeared to some extent justified by the official Report, from which the following extracts are taken, of the ROYAL COMMISSION OF INQUIRY INTO THE STATE OF THE GOLD-FIELDS IN VICTORIA (1855).

SOURCES OF DISCONTENTMENT.—The Commission have gathered from the various evidence on the subject submitted to them that this discontent, so far as it bears a general character, and is distinguishable from individual grievances, may be attributable to the following causes:—

The licence-fee, or more properly the unseemly violence often necessary for its due collection—a result entirely unavoidable in thus taxing for this considerable rate every individual of a great mass of labouring population; involving, as it did, repeated conflicts with the police, an ill-will to the authorities, from their almost continuous "hunt" to detect unlicensed persons, and the constant infraction of the law on the part of the miners, resulting sometimes from accident in losing the licence document, or from absolute inability to pay for it, as well as from any attempt to evade the charge.

The land grievance; the inadequacy of the supplies of land as compared with the wants of the population; the want of sufficiently frequent opportunities, and upon reasonable terms, for the acquisition of a piece of land; the difficulty, amounting with thousands to an impossibility, of investing their small capital or earnings of gold upon a section of ground; from want of which facilities many thousands, it is to be feared, have left and are still leaving this colony to enrich other countries with their industry and capital.

THE LICENCE FEE.—The want of political rights and recognised status, the mining population of this colony having been hitherto, in fact, an entirely non-privileged body, invidiously distinct from the remainder of the colonists, consisting of large numbers, without gradations of public rank, political representation, or any system for self-elected local authority; in short, contributing largely to the wealth and greatness of the colony, without enjoying any voice whatever in the public administration.

Amongst a multitude of all varieties of condition, many must have been always found destitute of the means of meeting such an expense, payable as it is in advance on the moment of entering the gold-fields. To such there is often but the alternative of concealment or imprisonment; while some, to avoid either of these misfortunes, have quitted the auriferous district as soon as they have arrived upon it. To carry out the law in its integrity, to oblige every one to pay the rate, or at least to endeavour effectively to do so, required a constant exercise of authority, and a continual disturbance of those who had paid, in order to detect those who had not. Scenes between the police and the miners were of daily occurrence, where mutual irritation, abuse, and gross violence would ensue. The loss of the licence-paper also, by accident or negligence, or even omitting to have the document upon the person ready at all moments for official inspection, would entail very annoying results. To be fined or imprisoned in such circumstances must have been at the least a hard alternative, but to be re-arrested and fined again, or re-imprisoned almost as soon as released, is trenching very closely on the limits of human endurance, although a course sanctioned by the letter of the regulation.

The Commission are unanimous in recommending the immediate abolition of the licence-fee.

WANT-OF-LAND GRIEVANCE.—Out of complaints innumerable on the land question, the Commission will deal, in the first place, with what appears the most important, and upon which their views were the most unanimous.

The success of many of the miners—a success realised probably after a season of great privation and labour—may very naturally explain this indication of a strong desire to acquire land and to form a settled home. On this subject the evidence is endless and the complaints universal, suggesting to the mind not only a most painful picture of the wholesale prevention of individual comfort and well-being to the population upon the gold-fields, but that in this neglect or inability, a policy is being pursued most suicidal to the interests of the colony at large. Indeed, that such healthful and desirable indications on the part of any class of colonists should have been responded to in the inadequate manner that is shown by the evidence, and that is, indeed, matter of common notoriety, is a result equally impolitic and deplorable, whether it arise from the inefficiency of departments to keep pace with the public wants, or from that extraordinary *statu quo* in which the greater part of the Crown lands of this colony have been suffered by the Government to remain since the Imperial orders of 1847 on the Squatting question. The Commission make a statement that seems almost incredible, to the effect, namely, that up to the end of 1854, after more than three years of gold-digging, only 80,000 acres of land in the vicinities of the gold-fields had been brought forward for sale; and that, of this quantity, the land being in some places very poor, there had been actually sold but 44,000 acres, for a population that during all that time may have averaged about as many individuals.

The favourable opportunity afforded for the extensive settlement of this noble country, by the general land-buying spirit of the last three years, occasioned by the stimulus of the gold discoveries, has been suffered to pass entirely away. This mania, to use a common expression, the natural and promising result of wealth and prosperity flowing over the colony, instead of being rendered, as it might have been, the source both of immense public revenues and of an extensive settlement of colonial population, has been allowed to expend itself in a worse than useless competition for the limited quantity of lands already in the hands of the colonists. For brief and illusory periods, therefore, these lands acquired almost fabulous prices. Becoming thus the objects of incessant traffic, they have placed the fortunes of many upon a temporary and fictitious basis; and the colony, in the reaction that has inevitably ensued, has been plunged into an embarrassing crisis, distressing for the time to various classes of colonists, and proving highly prejudicial at home to the reputation of Victoria as a suitable field for emigration.

POLITICAL RIGHTS.—Happily there seems not at present any difference of opinion in any quarter upon the question of conferring the franchise upon the industrial population of the gold-fields; although, as regards the mining proportion of that population, the electoral right must be based upon modifications in the miners' favour, as to residence and amount of qualification, differing materially from those of other colonists.

As delay may still intervene between the miner and his direct franchise rights, a virtual representation as far as practicable should be awarded. Thus an electoral roll should at once be made out, of all persons possessing the franchise upon the gold-fields by right of sold lands, to be available on the earliest occasion, to meet any new electoral arrangement that the law as it now stands will permit of for the representation of the gold-fields. And the Commission would further suggest an extension of the plan proposed by his Excellency with reference to nomination vacancies in the Legislature, which in one instance he was willing to fill up in accordance with the miners' selection. They advise that the miners' right be available for the selection of persons for these vacancies. Eight elective and four nominee members for all the gold-fields might thus be added to the present Legislature, thereby giving virtual representation to the gold-fields until the arrival of Imperial powers. As the sold lands are not generally held by actual miners, but commonly by retired miners or storekeepers, the elective proportion of these new members would not be held as fully representing the mining population. By the arrangement here recommended, this office would be performed by the nominees. Such a mark of confidence on the part of the Government would not be lost upon the mining population.

THE BALLAARAT OUTBREAK.—The evident state of excitement of the people upon the licence question (on the day after it was resolved to burn the licences) rendered it altogether unadvisable to entertain at that moment any idea of the ordinary business of licence-collecting. Whatever might have been intended by the official procedure, it was in reality only a premature defiance of the people, ineffectual for any good purpose whatever, and only tending to goad them to the very extreme that both parties should have laboured to avoid. The evidence of witnesses on this point is distressingly emphatic and distinct. In any popular movement, however unexceptionable the conduct of its main body, there is a section always in readiness to precipitate an extreme, and but too glad for a good excuse. Such an excuse was here given; and the Commission are disposed to agree in a very general view, that, but for the police proceedings in question, the subsequent outbreak might not have occurred. The people had not yet opposed any hostile front; and even if their movements were interpreted otherwise by the authorities, still this was not the mode to deal with the case. The ferment might have been expected shorty to subside, unless it broke out in some act of extremity. Either result should have been waited for. The erection of the stockade was a crisis in question, although the Commission are not entirely unanimous that, even at this stage, there should have been on the part of the authorities a deliberate shedding of human blood. They agreed generally that, since the popular excitement had culminated in that absurd but criminal procedure, the prompt attack on the morning of the 3rd was a movement alike well-timed and well executed.

The scenes connected with this outbreak, both during this conflict and before and after the occurrence, as stated to the Commission, and as currently rumoured, exhibit some of those disgraceful inhumanities that are the customary features of a social outbreak. The opportunity lay with the victors, and, of course, the burden of the sympathy and accusation is against their side. The foot police appear, as a body, to have conducted themselves with creditable temper; but, assuredly, on the part of the mounted division of that force, there seems to have been a needless as well as ruthless sacrifice of human life, indiscriminative of innocent or guilty, and after all resistance had disappeared with the dispersed and flying rioters. But the Commission decline to elaborate this subject further.

The Commission are entirely assured of the conservative elements upon the gold-fields. The observations made with regard to the array of police upon these districts apply still more strongly and unexceptionably to military force, which, as an arm of the State, is never cordially regarded under the irresponsible forms of a Colonial Government. Where a section of the people appear in armed insurrection, the sooner and the more effectually they are put down the better; but the great point should be so to meet the reasonable wants of the people as to prevent such a social outbreak, rather than to maintain a defiant arrangement for putting it down.

The Commission may allude, by way of illustration, to an order issued from the Government, about a month previous to the Eureka riot, that there should be a more frequent and rigid enforcement of the licence fee than heretofore. The police were to be ordered out at least twice a-week to detect the unlicensed. The Legislative Committee, in its previous consideration of this subject, had found that the frequency of these collecting or detecting sallies of the police, under the former monthly system, had been one great cause of irritation; and, with the special view of diminishing these occasions, they had recommended, and the Legislature had adopted, a system for the encouragement of quarterly payments. The spirit and intention of this arrangement is now entirely contravened, and the Commission can scarcely doubt that this order had a very injurious tendency.

The Commission believe that the crisis which was evidently gathering on the gold-fields would have been differently and more opportunely met had there been no military arm to rely upon. The introduction of the military into this colony was a measure connected with other and very different considerations than those of civil commotion. The rough hand of the soldier is a prompt cure; but it is a cure of the surface only, and it remedies nothing permanently any more than effectually.

APPENDIX H.

MINUTES OF EVIDENCE

TAKEN IN SYDNEY IN 1852 BEFORE A SELECT COMMITTEE OF THE LEGISLATIVE COUNCIL ON THE MANAGEMENT OF THE GOLD-FIELDS.

JAMES MACARTHUR, Esq., in the Chair, 24th September, 1852.

Members present—The Colonial Secretary, the Solicitor-General, Mr Cooper, Mr Holroyd, Capt. King, R.N., Mr J. Macarthur, Mr Suttor, Mr Wentworth.

The Rev. WILLIAM BRANWHITE CLARKE, M.A., called in and examined :—

1. *By the Chairman :* You have been recently employed in exploring the country with a view to the discovery of gold-fields ?—Yes, I have been employed in a geological survey in connection with that discovery.

2. Will you be kind enough to state to the Committee to what part of the country your attention has been more particularly directed ?—I explored the basin of the Shoalhaven River, and the country comprised in the Squatting district of Maneroo, with a portion of the Murray Squatting district, and the country intermediate between the Shoalhaven and the Murrumbidgee Rivers, embr[illegible]g an area of about twenty-three thousand square miles.

3. What was the extreme point to which you travelled to the southward ?—To about 37° 10′ south on the meridian of Delegete Hill, and to about 147° 50′ east on that parallel. My further western point beyond the boundary was on the left bank of the Mitta Mitta River ; and my furthest eastern point was on the coast about Twofold Bay.

4. Will you state at what parts of the country the gold-field is most likely to be workable ?—I have already laid before his Excellency the Governor-General a series of reports on the subject ; in these I have

pointed out the probable future importance of the country along the Mitta Mitta, the Delegete, and the Bendoc and Crac-en-bac Rivers; and of that between Lake George and the Murrumbidgee. I have also stated that gold has been found distributed in a general way over at least sixteen thousand square miles of territory. I doubt not that in this extensive area there must be many localities richer than the rest, though, of course, there must be localities where it does not exist in any considerable quantity, if at all. This region has not yet had a fair trial, not having been explored with respect to gold except by myself, or partially by others, whose numbers are too limited to ascertain its capabilities.

5. Your attention had been very much directed to the geological formation of this country previously to these exploratory trips?—Yes, I had previously surveyed considerable portions. My attention has also been directed to a study of the general geology of Australia.

6. Have you had collections of rock specimens from various parts of the country in a northerly direction?—Yes.

7. Will you be kind enough to state what is the farthest point in a northerly direction from which you have received specimens?—I have had different collections of rocks sent to me from the whole of the country as far as Wide Bay. I have also had collections, under examination, which were made during the exploring expeditions of Sir T. L. Mitchell, Dr Leichhardt, Captain Stanley, Captain Blackwood, Mr Kennedy, &c., and I have obtained much information and numerous specimens from others, so that I have been able to study the general character of the mineral formations of the country between this and Cape York and the Gulf of Carpentaria. Several thousand specimens of rocks and fossils have thus been at different times submitted to my examination, illustrated by the geological notices in the various accounts of the expeditions. I have also made extensive collections during my own investigations.

8. From examination of these collections and general observations of the geological structure of the country, have you formed any opinion as to the probable extent of the gold-fields?—So far as I have been able to judge, I believe the mountains separating the waters flowing to the coast and to the interior, all the way to Cape York, are made up of the same mineral formations which obtain to the southward. To this chain of mountains, from the western and southern parts of which Count Strzelecki collected specimens, which he exhibited to Sir R. Murchison, the latter geologist assigned the name of the "Australian Cordillera." Those specimens I never saw, but I have had numerous collections since from the western country, beyond the limits of my own exploration.

9. The same mountain range extends all the way to Cape York?—I have no doubt that the "Cordillera" extends throughout. Dr Leichhardt placed in my hands, for examination, fossils from the Burdekin River, and I found them to belong to the same epoch as the auriferous formations which I have since found to the southward.

10. Is there not, therefore, a strong probability that gold will be found the whole way?—The probability is that gold will be found on the flanks of the "Cordillera" in various localities, all through its range, wherever the formations I allude to are exposed—and if you connect with what I have already stated the fact, that the islands of the Indian Archipelago are auriferous, there can be no doubt that the same mineral formations are continuous throughout. I found among the collection of rocks made for me by Captain Stanley and Commander Yule in the

Louisiade Archipelago and New Guinea, some which are identical *in all* geological conditions with those found by me in various parts of the "Cordillera," and which, therefore, I take as evidence of the continuation of the chain. There were granites, porphyries, quartziferous schists, and trappean rocks. My impression is, that the "Cordillera" and its western parallels may be traced to the continent of Asia, being associated with Malacca and China by the agency of the Indian Archipelago. I advance these opinions to justify the conclusion that we have a right to expect gold far to the northward of any discoveries of that metal yet made in this country.

11. You think the same mountain chain, or "Cordillera," extends across Torres Strait to the Island of New Guinea or Papua?—I believe it is continued to New Guinea across Torres Strait, just as it is continued to Tasmania across Bass's Strait. I feel so sure of it that I venture to assert, if expeditions be sent to look for gold along the northern parts of the Cordillera, they will find it.

12. Have you any objection to state to the Committee when your attention was first directed to the existence of gold in this country?—It was in 1841, when I crossed the Dividing Range to the westward of Paramatta, in endeavouring to satisfy myself as to the extent of the carboniferous formation in that direction, that I first became aware of the existence of gold in Australia by detecting it at the head of the Winburndale rivulet, and in the granite westward of the Vale of Clwydd.

13. *By Mr Holroyd:* Did you go further to the westward?—No, I had satisfied myself as to the object of my journey, and returned home. At that time I knew nothing of the history of gold, but since then I have obtained every information I could upon the subject. There are many persons living who know that I, very shortly afterwards, began to speak of the abundance of gold likely to be found in the colony, and that as early as 1843 I mentioned it generally. On the 9th April, 1844, I also spoke to the then Governor, Sir G. Gipps, and exhibited to him a sample, but without any result as to further inquiry. The matter was regarded as one of curiosity only, and considerations of the penal condition of the colony kept the subject quiet as much as the general ignorance of the value of such an indication. In that year I exhibited the gold, and spoke of its probable abundance to some of the then Members of Council; and one of them, the late Mr Robinson, replied to me, "you ought to have been a miner," but took no further notice of it. The only person who seemed to take much interest in the subject was his Honour, Mr Justice Therry. I am able to fix the date of the time when I spoke to Sir G. Gipps, by the recollection that I spent that day with him at Paramatta, and that it was the day on which a certain great meeting of squatters was held in Sydney.

14. What was the character of the gold you found?—It was imbedded in a matrix of quartz, and also, as it is generally found, in granite, in small flakes. I did not find alluvial gold.

15. Did you make it known to any of your scientific friends in England?—Not at the time at which it was found, but I have written to my friends often since; and Sir R Murchison has quoted from one of my letters to him, in an article published by him in the 'Quarterly Review' of September 1850. The Editors of the 'Illustrated Australian Magagine,' published at Melbourne (October 1851), state also "that they had seen letters written by me to my friends in England ten years ago, which proved that I knew the country to be auriferous." (P. 211.) I do not mention these facts for the sake of speaking of myself, but to

substantiate my claim to have declared the auriferous character of this country many years before the present gold-workings began, and in consequence of the jealousies which have arisen respecting my knowledge and investigations of it. These were, and are, independent of any predictions or deductions of Sir R. Murchison, or of any discoveries of gold made here so late after my own as 1851.

16. *By the Chairman:* How much gold was there in the specimens you found in 1843 ?—The weight of one specimen was about a pennyweight, it was what might be termed a fair sample.

17. Did you find any other specimens afterwards ?—I had no opportunity of re-visiting the localities, my official duties prevented me; and when I had opportunities of again going away on detached duties, it was altogether in other directions. It was always my intention, had occasion allowed, to make a close investigation of that district.

18. *By Captain King:* Did you ever hear that Count Strzelecki had found gold at Bathurst ?—No, I never heard of his having found gold at all till last year, 1851 (June, I believe), when I read a letter published by Mr Walker in the 'Herald' newspaper, in which Strzelecki stated that he had found indications of veins of gold and silver near Wellington. There is no mention whatever of gold in his 'Physical Description,' which was published in 1845; and in the geological report of his journey to Mount Kosciusco and Gipps's Land, printed in the Parliamentary papers, the only allusion he makes to gold is in his notice of *auriferous pyrites*, which he says was too insignificant to be regarded commercially.

19. *By Mr Holroyd:* Did you obtain your specimens from the creek, or were they brought to you ?—The gold of which I have spoken, as having first led me to the knowledge of the existence of the metal in New South Wales, I obtained myself.

20. Did you break off any more quartz ?—No; I was not looking for gold. My object at that time was different. I was not then aware that other persons had found gold in various places of the western country.

21. *By the Chairman:* Were you aware of its containing gold until you returned home ?—I knew it was gold, but I did not at first see what it indicated.

22. *By Mr Holroyd:* You did not prosecute the investigation any further ?—Not at that time. I merely regarded it then as a mineralogical discovery. People know generally that gold is found in Brazil, in Africa, and in other countries; but I think very few persons knew then anything of the manner in which it occurs or is collected. Books taught me that gold had been generally found in ancient formations, and the notion then was that Australia was a country of yesterday, instead of what now I know it to be geologically a very ancient country. Reflection taught me the value of my gold, and I was led to investigate the age of the rocks in consequence. I sought collections from all quarters, and very soon came to conclusions of a satisfactory kind, from comparison of the rocks of different localities.

Examination of STUART ALEXANDER DONALDSON, Esq., Member of the Legislative Council, and subsequently appointed Prime Minister of the Crown in the first administration of Government by responsible Ministry in New South Wales.

(7th Dec., 1852.)

1. *By Mr Wentworth:* You made a statement in the Legislative Council, a few days since, with reference to an application made by you to the Chief Gold Commissioner's Office for a quartz-vein; will you be so good as to state to the Committee the circumstances connected with that application?—The circumstances which I alluded to in Council, so far as my memory serves me, are strictly these:—Mr Gideon Lang having told Mr Challis and myself that there were quartz-veins near the Great Nugget Vein which were not taken up by anybody, and which it would be worth while to apply for—Mr Lang having lately come from that district—Mr Challis and myself agreed to put in an application for such quartz-veins, with a view of working them, having capital to back us, and other facilities for working. Mr Lang accordingly gave me and Mr Challis a description of these quartz-veins, and produced, in his own writing, forms, such as are commonly issued from the office, to persons desirous of applying for quartz-veins. They ran very much in these words:—"Sir,—It is my intention to work a portion of the quartz-veins described below, under the regulations of the Government, and I request that some portion of such vein be allotted to me." Then followed the description:—"Half a mile of the Kerr Vein, Louisa Creek, commencing at the south corner of the Great Nugget Vein. S. A. Donaldson." These applications, so far as I can recollect, at least eight in number, were put in for divers veins; I think three were for the Macgregor Vein, and five for Kerr's Veins, at the Louisa Creek. At this time I may state that the Great Nugget Company were supposed to have got an enormously rich vein. A number of English Companies had been formed, many of them mere bubble companies, but among others was one real one, called the "Australasia Gold Mining Company," of which Mr Challis and myself were local directors; without reference, however, to that Company, we made these applications in our own names for those parts of the Louisa Creek, which at that time were supposed to be very rich in gold. Now Mr Lang, who was a partner in the Great Nugget Vein Company, knew perfectly well what was supposed to be the immense value of this vein, and in accordance with his advice we made application for two or three allotments to the north, which runs down, I believe, to what is called the Meroo Creek. We also put in applications for three to the south, which contained the supposed rich deposit, especially the one adjoining the Great Nugget Vein, and running *south* from the corner of that. I was associated at this time with three or four other gentlemen, among whom was Mr Want, who was afterwards connected with the Great Nugget Vein Company, and he chose,—for himself, Mr Walker, Mr Challis, Mr M'Laren, and myself,—some allotments, one of them to the south of the Great Nugget claim (this was somewhere about August or September, 1851), and Mr Hardy allotted them. In July last, when Mr Challis and I made the applications now under consideration, they were carried up by Mr Lang, in whose hand-writing they were, to the Commissioner's Office in Sydney, and deposited by him in due form. After the lapse of some days, I inquired whether they were granted, and Mr Lang told me that he had it, on the authority of Mr Naylor, the Clerk in the Commissioner's Office, that

they were granted. The success or *quasi* success of the Great Nugget Company became enormous, so much so, that we had accounts in the papers of the original five or six proprietors allotting shares to the public to the extent of some 200,000*l.*, 60,000*l.*, nearly one-third, being reserved for themselves, as a sort of bonus for admitting the public to share their great success with them. These newspaper statements are patent to the world, everybody knows them to have been published, and it might have been inferred, if the Great Nugget Vein were so rich and valuable, that those which adjoined it might be equally so. It therefore now became a matter of some importance to Mr Challis, to myself, and to the friends interested with us, to secure this claim to the south of the Great Nugget claim. My applications were put in on the 14th of July, and after a little lapse of time, on the 9th August, I received a notice from the Government, signed by Mr Hardy, as Chief Commissioner, stating that the Governor's approval had been given to my application for portions of the Macgregor Vein, and also for three allotments, I think, on the *north* side of the Great Nugget claims, but not a word about the *south side*, which was the one we were really anxious for. I then went into the matter with Mr Naylor, and required to see his book, which he produced, "Oh," said Mr Naylor, as far as I can remember, "your application has been cancelled by Mr Gideon Lang, and the fact is, Mr William Hardy (brother to Mr Hardy, the Chief Gold Commissioner), has got the one you are anxious about to the south of the Great Nugget Vein." Upon which I said, "It is impossible Mr Lang could have cancelled this. In the first place he would not do it on his own responsibility; and in the second he had no authority from me to do anything of the kind." I then went away and saw Mr Lang, who told me (as he will tell the Committee, if you ask him), that he never cancelled this claim either directly or indirectly, that he never had the intention of doing so, and never could have done so. The next day I went back to Mr Naylor, and said, "I will have this matter explained, I do not know how Mr Hardy could have got this claim to the southward, for on looking back in the book I find he had put in no application so early as the 14th of July." He said it was a claim Mr Hardy had held before, but that it had lapsed. Being rather nettled, I made some remark at the time, which I cannot remember, but it was to the effect that there was something wrong, and that I would not let the matter rest. Mr Naylor said he would look into it. I then went to Mr Lang, being very angry at this interpolation of Mr Hardy's name, and said I would have the matter inquired into. On the 16th of August, I received a note from Mr Hardy, approving of my application for these claims to the southward of the Great Nugget Vein. Having got that, I took no further trouble about the matter. My impression was that Mr Hardy's name had been improperly entered upon the register; and it was clear, when I received the official notice that my claim for the south portion of the vein was allowed, that either my right had been before over-ridden by Mr Hardy, or else some concession was made to me to which I was not entitled. To-day I see the book of registration contains an erasure of that very entry; it was then entered the "southern," it is now entered the "northern." With any clerical error I have nothing to do; I only know that, at that time, that claim was thought to be worth 100,000*l.*; and although I had not such a sanguine notion about it, I took the proper steps to possess myself of what was believed to be a valuable property, and my success or failure ought not to have depended upon a clerical error of that kind.

APPENDIX K.

MINUTES OF EVIDENCE

TAKEN BEFORE THE SELECT COMMITTEE ON THE GOLD-FIELDS' MANAGEMENT BILL IN NEW SOUTH WALES, 1853.

Examinations of the Rev. W. B. CLARKE, EDWARD HAMMOND HARGRAVES, Esq., CHARLES HENRY GREEN, Esq., Gold Commissioner; Mr WILLIAM TOM, Mr JOHN H. LISTER, and EDWARD DEAS THOMSON, Esq., Colonial Secretary.

WILLIAM CHARLES WENTWORTH, Esq., in the Chair.

Present: The Colonial Secretary, Mr Bligh, Mr Cowper, Mr Darvall, Mr J. Macarthur, Mr Wentworth.

(August 19th, 1853.)

The Rev. WILLIAM BRANWHITE CLARKE, M.A., called in and examined:

1. *By the Chairman:* You have been making a geological tour, which, during the last year or two, has extended over most of the auriferous fields of the colony?—Since I was examined before the Gold Committee of last session I have explored the Northern Districts.

2. Up to last session you had been engaged in examining and reporting upon the Southern Gold-fields?—Yes.

3. What is your opinion of the probable richness of the Northern Gold-fields? Do you think they will be as productive as those about Mount Alexander and Ballarat?—There are a great number of places in the northern districts in which gold has been found, but some of them have not yet been sufficiently worked to enable me to say whether they would prove very productive. Probably none will be as productive as those about Mount Alexander and that neighbourhood; but some places have been worked and found moderately profitable, and I think the gold-fields in the northern country will last some time to come; and that a great deal of gold will be produced there, when it will repay the gold-diggers to work for moderate returns, inasmuch as the auriferous region is of great extent, and new places are continually being dis-

covered. I have a map here of the country I have been over, showing where gold has been found, which may, perhaps, give you some idea of the extent of this auriferous region. In sixteen counties gold has been found to exist, though in some only in small quantities; but subsequent researches may lead to further discoveries. Besides gold, there is lead, copper, antimony, graphite, iron, and tin, and various gems. There are marble and other building stones, and abundance of coal.

4. Will you have the goodness to state, in round numbers, the area of the country you consider to be auriferous?—This is difficult to define with any accuracy, because the auriferous tracts are in patches. The area of the country I have examined cannot be less than 40,000 square miles, and gold, though thinly distributed, occurs in various localities in that area. The north-west, bearing from the head of the Peel, runs for about 150 miles through gold localities; and the north, bearing from the same point, nearly 180.

5. In how many different places within that area did you find gold?—Gold has been found in about forty different places. My Reports to the Government will give a more detailed account of the localities where gold is found.

6. You have seen Leichhardt's description of the country still further north?—Yes; and also the collection which he made.

7. What conclusions do you draw from those collections and his description of the country?—That there are gold-fields to the north. This opinion I have stated to the Committee on a former occasion.

28. Have you any particular information to convey to us which you think connected with the subject referred to this Committee, or interesting to the public generally? We shall be glad to hear it in your own way. Have you anything to add to your Geological Reports to the Government?—No; I have nothing more to state than I shall state in them.

29. *By Mr Darvall:* Have you had an opportunity of observing whether an industrious digger can, or cannot, readily pay the thirty-shilling licence fee? Is it, in your opinion, an excessive demand?—It is not, on any good gold-field.

30. By a good gold-field do you mean such as those you have been lately traversing?—Such as the Hanging Rock Diggings. Bingera may perhaps be an exception; but at the Rocky River I think an industrious man can very well afford to pay. I say Bingera may be an exception, because it is an extraordinary place. The gold lies in lumps there about the surface, and has never been found, I believe, much deeper than three feet. It has not yet been fully worked. I have seen an aboriginal shepherd there who collected a plateful of gold which he had found on the ground. The success of the diggers there, and the number of licences issued, are continually varying. It is a very extraordinary place, the most extraordinary in the country for the capriciousness of the distribution of gold.

31. *By the Chairman:* What do you infer from finding gold there upon the surface instead of at a greater depth?—That the rocks once above the present surface have been destroyed, and have left the gold upon it. It has never been drifted far I am certain. It is local gold, and there are patches of quartz which yet contain it *in situ*.

32. It has been deposited there by the disintegration of the rocks?—The rocks containing the gold have been disintegrated and carried away. The gold is of a very different character to that which is found above on the Rocky River, and in other places more to the S.E.

49. *By Mr Cowper:* When last examined you expressed certain opinions with regard to the existence of auriferous districts to the northward—have you had opportunity since then of testing those opinions?—Those opinions are strengthened. I have seen more recent collections of rocks. I have no doubt there is gold more to the northward than I was able to travel. I think it not unlikely some gold exists at the back of Port Curtis, on the Burdekin River, and elsewhere. I intend to state my views on this subject in a separate communication to the Government, when I shall have completed the Reports on my last journey.

JAMES MACARTHUR, Esq., in the Chair.

(June 29th, 1853.)

EDWARD HAMMOND HARGRAVES, Esq., called in and examined:

1. *By the Chairman:* You are desirous, I believe, of submitting some evidence to the Committee in support of the claim you have made upon the Government, as the first discoverer of a workable gold-field in Australia?—I do not know that I have any evidence to offer; I can give a statement of the circumstances.

2. Will you be kind enough to state the circumstances connected with the discovery?—I came to this colony from California for the purpose of making the discovery, having previously written to some friends here, who took no notice of the matter. On my return here, I placed myself in communication with Mr Norton, who was a friend of mine, and he wrote to Mr Icely, stating my belief in the existence of a gold-field in the Bathurst country, as I had some seventeen or eighteen years previously seen that part of the country. Mr Icely promised me the necessary means to carry out my views, and I met him about the 10th of February; he then told me that he was sorry he could not accompany me to see me make the discovery, in consequence of particular business which required his attendance in Sydney. I then went on to Guyong, to an inn kept by Mrs Lister, whom I had previously known, and asked her if she could recommend to me some persons to act as guides. She requested me to take her son with me, and I consented to do so on condition that he observed the strictest secrecy as to my proceedings. On the 12th of February I went to the Lewis Ponds Creek, and there made the discovery. I immediately wrote to Mr Icely, telling him the extent of country I had been over, the discovery I had made, and that I believed the gold-field would pay labourers from 7s. to 15s. a day.

3. *By Mr Bligh:* That was at the first discovery?—Yes, on the 12th of February, 1851.

By Mr Cowper: Will you state here what took place between yourself, Mr Lister, and Mr Tom, the first time you went to Guyong?—There was nothing took place except that I told Mrs Lister I wanted a guide to conduct me to that part of the country—that is, Emu Creek, Lewis Ponds, and Summer Hill Creek. She asked me to take her sons. I consented to do so, on the condition I have named, and promised her that in return they should have the first diggings, if I were successful, and that I would instruct them how to work. That was the only arrangement that was made.

6. You clearly explained to them that your object was to search for gold?—Yes; this was to John Lister only.

7. When did you afterwards communicate with the Messrs Tom?—I did not communicate with them. I wanted to go to the Macquarie country, and young Lister said he did not know that part, but that the Toms had a station there, and that if I would take one of them he was sure he would keep secret everything connected with the transaction. I accordingly took Mr James Tom, and he was also promised to have a share in the first diggings.

10. *By Mr Bligh:* What induced you to go to Lewis Ponds Creek?—I had been there seventeen years before, when Mr Jamieson had a cattle station there; I was at that time living with Captain Hector, and, from what I remembered of the country, I thought it was likely gold would be found there.

11. Did you not, when you called at Mrs Lister's, intimate that your purpose was to go on to Wellington?—Yes; I went to Wellington afterwards.

12. At the time you called at Mrs Lister's, did you not tell them that you intended to go on to Wellington to search for gold?—I said that my intention was to search the whole country.

13. *By Mr Cowper:* Did you mention any particular district?—I told Mr Icely where I was going to.

14. *By Mr Bligh:* Did you tell Mrs Lister?—Not that I am aware of.

15. Was it not at Mr Lister's request that you went to Lewis Ponds?—Not that I am aware of.

16. Did not Mr Lister recommend you to go and search at Lewis Ponds?—He did not.

17. Did you suggest to him that you should go there, or did he suggest to you?—I suggested Summer Hill Creek.

19. What discovery did you make at Lewis Ponds Creek?—We turned out our horses when we got there, and I said, "Where you walk over now there is gold, and I will show it to you directly, after getting something to eat." There was a schistose dyke cropped out in the bed of the creek; I washed out six pans of earth, from five of which I produced a grain each of gold, and in the sixth there was nothing. As there was a shepherd near with his sheep, and as it was getting late, I would make no farther observations, and we returned.

20. Do you mean that there was a speck of gold in each dish?—A piece of granular gold.

21. Not a grain in weight?—I did not weigh it; there was one piece which I think would have weighed more than a grain.

22. *By the Chairman:* What did you do with those specimens?—I believe I have them yet.

23. *By Mr Bligh:* Had you previously to this been informed that a person named Smith had found gold on this creek?—No, I had not.

24. Had you been informed that gold had been found on this creek by any one?—No, I had not. I had heard of Macgregor, the shepherd, finding gold in the Wellington district.

25. Before you arrived at Guyong, your purpose was to have gone to Coombing, in a different direction?—Yes, I was going to Coombing, but meeting with Mr Icely at King's Plains, I told him that I knew of a place which I had no doubt was a gold-field, and that I would meet him at Coombing when he returned.

32. *By Mr Cowper:* The petition of William Tom, junior, James Tom, and John Lister, which has been presented to the Council and referred to this Committee, states that you were on your way to the Wellington district to search for indications of gold, but that upon being shown

certain geological specimens which Mr Lister had collected as indicative of the presence of gold in the immediate locality, you proposed that he should furnish a pack-horse and other necessaries, such as tools, provisions, &c., and that you and he should proceed to prospect the Summer Hill or Lewis Ponds Creek. What observations have you to make with reference to that statement?—I was going to Coombing, and when I met Mr Icely, and was informed by him that he would not be home for several days, I said I would go to the part of the country where I expected to find gold within forty-eight hours, and that I would write to him. I had previously been over the whole country from Swallow Creek, past Summer Hill, to Lewis Ponds and Emu Creeks, seventeen years before. There was no arrangement about a pack-horse that I recollect; we rode out in the morning, and came back the same night.

33. You say it was not at the first but at a later interview that Mr Lister told you he had been out with two geologists; can you, after this lapse of time, state how long this was after the first interview?—Eight or ten days after, when we went over the country where they had been. At the time when he went with these parties his family were not living at Guyong, but at the Rocks, twelve or fourteen miles on this side of Guyong. There was a piece of gold alleged to have been picked up near the Rocks, which led to their search in this direction.

34. *By the Chairman:* I understood you to say, in answer to a previous question, that Mr Lister might have shown you specimens prior to the 12th of February?—He might. On every mantel-piece there were specimens of copper and quartz, with iron pyrites.

35. I am speaking of specimens indicative of gold?—He did not show me any such specimens that I am aware of; I cannot tax my memory to recollect it. Mr Lister told me he had never seen any gold in his life.

36. Then these specimens had nothing whatever to do with fixing your determination to prospect Summer Hill Creek?—Nothing whatever. As soon as I saw the gold-fields in California, I pronounced my opinion that there was gold to be obtained in the part of this country which I had seen seventeen years before; and I wrote to this country to that effect.

40. *By the Colonial Secretary:* Did you hear of Macgregor finding gold in the district before you went to California?—No, not before I went to California; but I was informed of the fact by an innkeeper, near the Vale of Clwydd, when I was going to Bathurst.

42. You had not heard of anybody having discovered gold in that part of the country before you went to California, or while you were in California?—I had not; when I returned Mr Norton told me of Mr Icely having found gold in the matrix.

43. *By the Chairman:* Will you proceed with your statement as to what you did after the 12th of February?—Wishing to see the Macquarie country, and Mr Lister not being acquainted with it, he requested me to take a young man with me, named James Tom; this I agreed to, provided Mr Tom would keep to himself what he saw me do. He introduced the young man to me, and he agreed to do as I wished. He went with me to Burrandong, on the Macquarie; we followed it up as far as the junction at Summer Hill, where I found what I considered was quite sufficient to warrant me in bringing the matter before the Government. I then went to Wellington, wishing to see the quartz-vein from which Macgregor had obtained his gold.

44. Did you discover any gold at Wellington?—I did, as far down as Dubbo; I went to Dubbo.

45. From Wellington, in what direction did you go?—I went to Mitchell's Creek, and examined the country in that direction, having a black for a guide, and then returned to Guyong.

49. What occurred at Guyong?—There were at that time some returned Californians in Bathurst, and I was desirous of having the matter kept quiet for a while, but as I had most important business to attend to in Sydney, I told Messrs Tom and Lister I was obliged to leave them (it will be unnecessary for me to explain my business, the fact is recorded in my letter of the 3rd of April to the Colonial Secretary); but before doing so, I instructed them how to make and use a cradle, and for this service they were to get me some specimens, and forward them to me in Sydney. I then returned to Sydney, where I arrived about the 20th of March.

50. Did you get the cradle made before you returned?—Before I left Guyong; it was actually made before I set out, and I instructed them in the use of it; I also told them where to go and work. The cradle was a thing they had never seen before in their lives.

52. *By Mr Cowper:* What did you do with the specimens which were collected by you before the 17th of March,—did you bring them to Sydney or leave them in the district?—I brought them to Sydney; I took some to Brisbane Water with me, and gave as much as I thought necessary to the Colonial Secretary. The first specimens I obtained I took with me to Brisbane Water; but altogether the amount was very small.

53. Where did you collect them?—At Lewis Ponds Creek, at the Macquarie, and at Summer Hill.

56. *By Mr Bligh:* When you returned from Wellington to Guyong, did you bring any gold or specimens with you?—I do not recollect; I gave a few grains to Mr Cruikshank before I left Dubbo.

57. Did you yourself search for gold on your return from Dubbo anywhere in the neighbourhood of Guyong or Lewis Ponds?—No, not that I recollect.

58. You did not yourself dig for gold?—Not that I recollect.

88. *By Mr Macleay:* Had you been to the Turon when you were in that part of the country seventeen years before?—No.

89. Did Mr Tom suggest the Turon as a probable gold-field?—I think it was James Tom, when I was showing him the country where gold was likely to be found, said "The Turon is very much like this country, and no doubt the Turon would produce gold."

90. *By Mr Bligh:* Up to the time of your return to Sydney you had found merely a few grains of gold at different places?—Yes. I had not worked for gold, it was merely a preliminary step to ascertain the existence of gold in the country in alluvium, which was entirely a new discovery.

103. *By Mr Cowper:* Will you state at what date you arrived from California?—About the 17th of January, 1851.

104. Before you started for the Bathurst country, on this prospecting tour, did you state to any friends in town your object; or was it necessary for you to make any extraordinary efforts to accomplish your purpose?—Yes; I had to borrow money at an exorbitant rate of interest, to buy a horse, and to furnish myself with other matters necessary for my expedition.

105. Was any expression used by you to Mrs Lister, before you left the district, indicative of hopelessness or despondency; had you not given up the matter as hopeless?—No; my letter to Mr Icely would show my

views. When I came to Sydney, I immediately went to the Colonial Secretary's office, and sat for three hours with a wet coat to see Mr Thomson. I should not have left the district unless I thought I had done all that was necessary as a preliminary step; nor should I have persevered in doing what I did, had I not been convinced of the existence of an available gold-field.

106. Are these statements in Messrs Tom and Lister's petition in accordance with the fact, that gold was found "in almost every spot tried, but not in sufficient quantity to pay for working; and the said Edward Hammond Hargraves left the party to attend to his private affairs, with instructions to persevere in their efforts," and that "at this time the said Edward Hammond Hargraves did not deem the discoveries already made of sufficient importance to be published to the Government or the community at large?"—They are not; I did publish it to the Government. I never worked for gold to see if it would pay for working; it was merely an opinion which I gave as to what it would pay.

108. *By Mr Cowper:* Can you recollect the date when you sat three hours waiting in the office of the Colonial Secretary?—No, it was very wet weather; about the time the drought broke up.

110. *By the Chairman:* Was it previous to the date of the letter you wrote to the Colonial Secretary?—I had three or four interviews previous to that; I think it was the 23rd or 24th March. I met Mr Icely in the waiting-room.

113. Did you receive any communication from Bathurst, from the Messrs Tom and Lister, upon the subject of what they were doing?—On my return from Brisbane Water, about the 24th April, I received a letter from John Lister, stating that they had taken the cradle to the place I had instructed them, and had got four ounces of gold; which letter I took to the Colonial Secretary as a further proof of the discovery.

123. *By Mr Bligh:* Was it not your intention to have gone to the northward if you had not received intelligence from the party at Guyong of their discovery of gold?—It was not; I was waiting the reply of the Colonial Secretary to my letter respecting my discovery on the 12th of February.

124. Then it was not your intention to go to the northward?—It was not at that time; I went thirty or forty miles in that direction, but the country was all of sandstone formation, and I did not get off my horse to look for gold.

125. When at Brisbane Water, did you not propose to take a trip to Moreton Bay?—Not that I recollect.

126. In the letter referred to, to Mrs Lister, of the 5th of April, you say "tell John to write if he should make any further discovery, and say to Mr William Tom that I am obliged to him for his favour of 24th March, and not to mention about the locality that we have been over; as for gold being found it is of no consequence who knows it, but the localities should not be mentioned; and if I should come up to Guyong with any strangers, not to say anything about gold, I have particular reasons for it." What observations have you to make upon that?—After making the arrangement, as I considered, with the Government, I did not care who knew about gold having been found; in fact I got a friend to write a letter saying that gold had been found. I wanted to draw the public attention to the fact.

129. In the former part of the letter, you say also "Yesterday's post brought a letter from William Tom, and I think, from the result, they

have not worked the cradle right; I now hope to be able to carry out my intention of prospecting the whole country under the auspices of the Government; if so, I shall visit your neighbourhood shortly. I have made them a proposition, which I hope they will accept; the matter is now before them for their consideration. To accomplish the research would cost at least 300*l.*, which is more than individual enterprise can spare. You will hear from me as soon as I can get a definite answer." Is that a passage in your letter?—Yes, it is.

130. *By Mr Cowper:* You deny that you ever made use of any expression to the Messrs Tom to the effect that you had given the matter up as a failure?—I did not; I could not have made any such remark, for my interviews with the Colonial Secretary, and my writing that letter of the 3rd of April, will show what my views and opinions were; and I had previously written to Mr Icely.

131. *By the Colonial Secretary:* Did you not describe the gold-fields as extending over hundreds of miles, and, in your opinion, as rich as the gold-fields of California?—I did. I made the discovery at a very dry time; there was no water, and even if disposed to dig I could not have washed for gold in most places; there was only the Lewis Ponds in that neighbourhood where water could have been obtained.

132. It had been a season of unusual drought?—Yes; I was a whole day on Mitchell's Creek, and never got a drop of water.

142. *By the Chairman:* After the communication between yourself and the Executive Government, you returned to Bathurst?—Yes, and saw Mr Tom. I went over to Mr Icely's; Mr Stutchbury was encamped near there; I had an interview with him, and he agreed to come down in a few days. In the meantime I went down to the mines, which had then attracted a good number of people; many parties applied to me, and I told them where to dig, and instructed them how to work.

143. Did you, at this period, enter into any agreement with the Messrs Tom and Lister?—No, I did not; but the Toms and the young Lister said they were so much indebted to me for what I had done for them, that they were determined I should have an equal share of all the gold they collected, as a gratuity for the position I had placed them in.

145. Was this stated in writing or verbally?—It was a verbal arrangement; it was proposed as a gratuity to me for what I had done for them. I said I would accept it. I thought they were very fortunate, for they earned 20*l.* a day, and took between 400*l.* and 500*l.* worth of gold into Bathurst. I went to Bathurst, and imagined that I should get one-fourth share as a gratuity for what I had done; they sold the gold, and got into wranglings and disputes in which I was called upon to interfere, and I never saw much of them afterwards, nor ever got a grain of the gold.

148. Was the Fitzroy Bar, the place now called Ophir, known to you until your return to Guyong; had you known anything of the existence of this place, until you heard from Tom on the 24th April? Yes, I had been there.

149. Before the 24th April?—Yes; we came up the Macquarie, and all up the Summer Hill Creek to the Junction at the place the Messrs Tom call Fitzroy Bar, and came on to Guyong.

150. Was there any discovery of gold made at Fitzroy Bar while you were there?—I do not know that there was in that very place.

154. Do you know where gold, in any quantity, was first found—where the four ounces were found?—I do not.

160. *By Mr Bligh:* Did not Tom, in his letter, or Lister, tell you

where they found the four ounces of gold?—Yes; they told me they had found it at the Junction.

164. *By the Colonial Secretary:* You had indicated that spot to them previously as one where gold was likely to be found in considerable quantity?—Yes; I said pieces of gold would be found there as large as my foot, when it came to be opened out and worked.

167. It was previous to the time when you had an interview with me on the subject of the gold discovery?—It was; it was before I left Guyong on the first occasion.

170. *By Mr Cowper:* Do you understand what the petitioners mean by this statement,—"That your petitioners paid the whole expense of the enterprise from the beginning up to the time of this announcement, and endured many days and nights of extreme hardship in establishing the above important fact, the merit of which the said Edward Hammond Hargraves so adroitly appropriated to himself?"—I do not know what expense there was except eating their beef and damper, and drinking their tea. I do not know of any other expense that people go to in the bush.

172. There is another allegation in the petition,—"That your petitioners were the first parties who prospected the Turon with success; on receiving the intelligence of which the said Edward Hammond Hargraves reported the discovery to the Government, without having been on the ground at all." What do you say to that?—The first person who prospected the Turon was Mr Suttor, I believe; I do not know for a fact who it was. However they told me they had got some specks of gold in the Turon, but I never made any report about it.

173. *By the Chairman:* You did not report the Turon to the Government as a gold-field?—I did, in a general way; that is, I said it was likely the Macquarie, the Lewis Ponds, and the Turon were gold-fields.

174. Did you assume the merit of having made the discovery at the Turon, in any report made to the Government?—No further than I mention. While I was at Wellington I desired them to go to the Turon, and they told me they had been there. Having seen the country, I mentioned it in a general way as likely to prove a gold-field.

176. *By the Colonial Secretary:* You directed attention to the Turon as a likely place to find gold?—Yes.

177. *By Mr Bligh:* Did you not state, in a former part of your examination, that James Tom first told you he thought the Turon a likely place to find gold?—He told me that if the country I pointed out produced gold, the Turon was a likely country to do so. I said to him, "Well, go there," and we went past the junction of Summer Hill Creek with the Macquarie, where I got a view of the country from the heights; I said "it looks a good country," and directed him to go there.

178. *By the Colonial Secretary:* It was your description of the nature of a gold country that induced him to believe the Turon would turn out a gold-field?—It was.

179. *By the Chairman:* What do you say to this passage in the petition,—"Had it not been for the persevering efforts of your petitioners, the discovery of gold would most probably have been delayed for years?"—They assert that they made this discovery on the 7th or 8th of April, at Summer Hill Creek; and I had been in communication with the Government nearly a month previous; had recorded my views, and was then on my way to point out the gold-field to the Government Geologist, at the request of the Government; so that I do not see that they have contributed to it in any way except for their own benefit.

180. *By the Colonial Secretary:* In fact you had yourself discovered gold on the 12th February previous ?—Yes.

181. Did you make any record of that discovery ?—I made a memorandum of it on the very day; and, if I remember right, gave you that memorandum with a small specimen of gold. Some months afterwards, having found the very memorandum amongst some old papers, I sent it as a curiosity—a relic of the great event.

190. *By Mr Bligh:* You say you were going up to point out the gold-field to the Government Geologist ?—Yes.

191. At that time a large quantity, four ounces, had been found, and you had received intelligence of it ?—I had, and communicated it to the Colonial Secretary.

192. On your return to Sydney, from your first trip to the westward, you could not have fixed upon any one spot more than another as being a gold-field ?—I did do so.

193. You have told us you found specks of gold in almost every place you tried ?—Yes; the geological structure of the country indicated it as a gold-field.

194. Whether a paying one or not you could not tell ?—I believed it was a paying gold-field; I told the Colonial Secretary that, when worked, I believed it would be equally rich with the Californian gold-fields.

197. *By the Colonial Secretary:* Where did you get the specimens you sent to me, on your second visit to Summer Hill Creek ?—The first specimens I dug myself.

198. The second specimens, consisting of nuggetty gold and grain gold ?—I bought them from the Toms, and gave them 3*l.* 7s. an ounce for them.

201. *By the Chairman:* I wish to recall your attention to the statement you made just now; you say you never received any gold from the petitioners ?—I bought it. When I returned from Sydney with Mr Stutchbury, they proposed the arrangement I have mentioned to me. They said, for all the good I had done them, and the position I had placed them in, they would give me an equal share of all the gold they obtained; and they also said, that of the four ounces they had already found, I should have one ounce, and I then proposed to buy the remainder from them at 3*l.* 7s. an ounce. It was three-quarters of an ounce they gave me, not a full ounce.

203. It is stated, in a letter from these petitioners to the Chairman of this Committee, Mr Wentworth, "Mr Hargraves returned us, at Ophir, *three-fourths* of the sum which he said the gold we got and put into his possession realized." Was that the case ?—The gold in question was sent to the Colonial Secretary. I have not sold a farthing's worth of gold in the colony, the produce of New South Wales. I never had gold placed by them in my possession; I bought the gold from them, and paid them for it there and then, and forwarded it to the Colonial Secretary. I did not consider it of any consequence then, for I could have bought it from other parties. There were hundreds of people working at that time.

205. *By Mr Cowper:* You looked to the Government for reward ?—Yes; I never dug a grain of gold for profit, or accepted a grain of gold.

210. *By the Chairman:* Is there anything else you have to say in support of your claim ?—No, nothing; I am quite satisfied to leave the matter in your hands. I hope, if you consider that I am the party entitled to be rewarded, you will deal liberally with me, for I have

refused some handsome offers from companies and individuals. The Governor told me, by remaining, and giving my services to the Government, would augment the reward I might receive from the Home Government. I have now been two years through the length and breadth of the land in search of gold, and, with the exception of my appointment, I have derived no personal benefit, I have never received one farthing.

211. *By Mr Bligh:* You have held a Government appointment since that time?—I have.

214. Will you state what you have received?—The amount of my salary at the rate of one pound a day, and I am allowed ten shillings a day for my personal expenses in travelling. I received in the first instance from the Government, according to arrangement, 500*l.*, and 250*l.* at the time I was going to Melbourne.

216. *By the Chairman:* When did these Government allowances commence?—I was put on the Government establishment on 3rd June, 1851.

217. *By Mr Bligh:* Have you made any claim on the Government of Victoria for compensation?—I have; I have written to the Lieutenant-Governor in reference to the discovery having extended to Victoria, and the benefit that colony has derived from it. The Lieutenant-Governor has answered my communication, by stating that he will bring the matter under the consideration of the Legislative Council of Victoria. [*The witness handed in the letters referred to.*]—*See page* 115.

218. You consider you have a claim upon them?—The Governor-General was kind enough to say that he thought I had a claim, and should make an application; I made an application, which the Governor-General was good enough to forward for me. You can have a copy of it if you wish. I have no desire to conceal anything from the Committee; I court inquiry into every circumstance connected with the discovery. I will furnish you with a copy of my correspondence with the Lieutenant-Governor of Victoria, together with his reply.

Extract from Examination of CHARLES HENRY GREEN, Esq., Gold Commissioner.

(16th June, 1853.)

W. C. WENTWORTH, Esq., in the Chair.

216. *By the Chairman:* Have you seen the petition of William Tom, jun., and James Tom, both of Springfield, near Bathurst, and of John Lister, of Guyong, which has been referred to this Committee?—Yes.

217. Who do you think was the real discoverer of this gold—was Mr Hargraves, or were these young men?—I have *heard* that at the time they discovered it Mr Hargraves had given up the search; it is so reported in the western district; it is a matter of notoriety.

218. Was the first discovery of gold in any quantity at Fitz Roy Bar, as stated in this petition?—Yes.

219. Was that discovered by William Tom and John Lister, in the absence of Mr Hargraves?—Yes, I have heard so.

220. Do you believe the allegations of this petition to be true?—I do, from what I have heard from various parties. I think it was on the 9th or 10th of May, the day after Mr Hargraves came into Bathurst, that I, as Crown Land Commissioner for the District, went to Summer Hill Creek to call upon the people who were there to desist from digging upon

Crown lands. When I arrived there I found four or five people, among whom were the Toms and Lister; they showed me the gold they had got, and stated that Mr Hargraves was their partner. When I served them with notice, they said they had expected something of the kind, and had provided for it by getting an authority from Mr Hargraves to dig. They produced this authority, which was, as nearly as I can recollect, in these words, "I hereby authorise the Australian Gold Company," I think that was the name, but I am not quite sure, "to dig for gold on the undermentioned bar, Fitz Roy Bar, for a mile down from the junction," and some other bar a mile up, "and to prevent all other parties working within the said boundaries. Signed Edward Hammond Hargraves." I forget what he called himself, but I think it was Gold Commissioner. I told them that this authority was of no avail, and that if Mr Hargraves had been there I should have served him with notice.

221. You saw these young men without Mr Hargraves at Fitz Roy Bar?—Yes, and they showed me several ounces of gold they had procured.

222. Was it after this that Mr Hargraves delivered his lecture at Bathurst?—It was before this that he came into Bathurst and showed some gold, and told the people where it was got. I went out the next morning, and Tom and Lister said they were working in partnership with Mr Hargraves, and that they shared alike; they have also told me since that the gold they had was sold, and that Mr Hargraves had received his share of the proceeds; and I believe they can prove that he did receive his share. I know it is generally understood at Bathurst that Mr Hargraves had gone away, and that the gold was found after he left.

223. Do you mean that he had gone without any intention of returning?—Yes, under the impression that they could not find gold in sufficient quantity to pay; so I have understood.

224. *By Mr Finch:* It would, in all probability, have been found in two or three days by Mr Rudder if it had not been discovered by Mr Hargraves?—Yes; Mr Rudder, I believe, left California with the same intention as Mr Hargraves, but was shipwrecked.

225. *By the Chairman:* Your impression then is, that if the Council were to vote a sum of money as a gratuity for the discovery of gold-fields in this country, Mr Hargraves would not be entitled to the whole amount?—I do not say what amount he would be entitled to; no doubt he showed these young men how to obtain the gold, and without his assistance they, in all probability, would not have found it; but I believe they were the actual finders of gold in sufficient quantities to pay, and they spent a good deal of money and time in the search.

JAMES MACARTHUR, Esq., in the Chair.

(30th June, 1853.)

Present: Mr Bligh, Mr Cowper, Mr Finch, Mr J. Macarthur, Mr Macleay.

Mr William Tom called in and examined:

1. *By the Chairman:* You are one of the parties who addressed a petition on the subject of Mr Hargraves's claim for compensation for the discovery of gold in this country?—I am.

2. Will you state to the Committee when you were first in communi-

cation with Mr Hargraves relative to the search for gold, and also what took place between you up to the time of the discovery?—Mr Hargraves, some time in the early part of February, 1851, came to Guyong and called at Mrs Lister's. He saw Mr John Lister, and told him that his intention was to go on to Wellington for the purpose of looking for gold, and, if possible, to discover an available gold-field in that neighbourhood. Mr Lister, upon this, showed him certain auriferous signs which he had procured in the neighbourhood of the Turon. Mr Hargraves believed these to be indicative of gold, and said to Mr Lister, "If you will furnish me with a pack horse and other necessaries we will both go to the Turon, and down this creek," meaning Lewis Ponds Creek, of which they were then at the source. It was then arranged that they should proceed together to Lewis Ponds Creek. I will not say at whose suggestion the first trip was made, but they went on the 12th February, 1851, some fifteen or sixteen miles from Guyong, and within two miles of Ophir. Here the first pan of earth was washed, at the instance of Mr Hargraves, and it yielded, I believe, one minute almost invisible speck of gold; then two or three dishes were washed in succession, with about the same result as the first. This being over, they thought they might as well return to Guyong, and they did so that night, at least so I believe.

3. You were not there?—No. I am now giving Mr John Lister's version of the matter. Neither my brother James nor myself had seen Mr Hargraves at this time. After their return to Guyong it was arranged between them that they should still go on with their prospecting operations, and that their next trip should be to the Macquarie. Not being acquainted with that part of the country, they wanted some one to conduct them through the bush, and I think, at Mr Lister's suggestion, Mr Hargraves initiated my brother James into the way to procure gold, and so on; and he went with them as their colleague and guide. They were away some considerable time, and found gold in almost every place they tried, but in no place sufficient to remunerate any one for digging. After Mr Hargraves had accomplished this trip I do not think he went on any other, but I cannot be positive; however nothing of importance was discovered between the time of his return and his starting to Wellington, some time in February or the early part of March. I have a letter which he wrote from Wellington, dated the 7th March, and I think he speaks in that of having arrived there the previous evening.

4. *By Mr Bligh:* To whom is that letter addressed?—To Mrs Lister; he never wrote to us. During the time he was at Wellington, my brother James and Mr Lister went to the Turon and found gold there in small quantities, but they discovered nothing more than had before been discovered when Mr Hargraves was in their company; they found no available diggings—nothing that would pay.

5. They did not find anything more than a few small specks?—They found gold there, and on the faith of that gold I believe Mr Hargraves reported to the Government that the Turon was a gold-field, although he had never been there at the time. I think it was during Mr Hargraves's absence at Wellington that my brother James, and Henry, and myself, went to try a place with the rocker; but still, from the tenor of a letter of Mr Hargraves, which I looked at yesterday, I think it could not have been at that time.

6. Mr Hargraves has stated that the rocker was made after his return from Wellington?—Then, in that case, I am wrong as to the date

when we procured the seventeen or seventeen and a half grains of gold. I was under the impression that it was when he was absent at Wellington, but in a letter, which I read yesterday, he said that he would be able to carry out his intentions with regard to the Government in consequence of the discovery, which shows that it was made after his return from Wellington. In one of his letters he desires Mrs Lister to thank me for a letter he had received of us, from me; this letter, written by me, gave an account of the seventeen grains in weight of gold got by my two brothers and myself. I now think it was this letter he got from me which altered his mind about going to California, and made him think he would be able to carry out certain intentions with the Government.

8. *By Mr Bligh:* You, I believe, made the rocker?—Yes. Mr Hargraves laid down the principles.

10. When Mr Hargraves returned to Guyong from Dubbo, what was done?—He left for Sydney.

11. He remained at Guyong some time, did he not?—He did not prospect at all during that time, to my knowledge.

12. *By the Chairman:* When were you admitted as a partner?—I cannot say what was the date; I believe I had been out searching off and on in my brother James' place, he having to go to Adelaide, but I will state the circumstance which made me believe I was associated with him as a colleague. When he was going away to Brisbane Water, I believe on the evening immediately preceding his departure, he came to wish us farewell, at my father's place of residence, Springfield, about four miles from Guyong. When he was about to start I accompanied him to my father's stable, and after his horse was taken out, he and I arranged that when he got home he should proceed to the Moreton Bay district, and give that country a thorough prospecting trial; he said if he did not succeed, he intended as soon as he returned to go to California. This was his expressed intention to me while he was holding his horse at the end of my father's stable. I made precisely the same arrangement with regard to what I would do in the neighbourhood we were then in, the Guyong, or rather Ophir neighbourhood.

13. What do you mean by the expression, "I made precisely the same arrangement with regard to my neighbourhood?"—I made precisely the same concessions to him,—that if I were successful I would communicate with him, and he promised to write me if he were the successful party.

30. *By Mr Bligh:* Will you now go back to the time when Mr Hargraves was about to leave Guyong for Brisbane Water, after his return from Dubbo, and state what took place?—Mr John Lister and I arranged to go to the Macquarie; on the day we started I told Mr Lister that we had better go towards Summerhill Creek, as I knew that a piece of gold, weighing some ounces, selling on one occasion for 11*l*., and on another occasion for 14*l*., had been procured either on the bar now called Fitzroy Bar, or in its immediate neighbourhood. Mr Lister assented to what I proposed, and we went to what is now called Fitzroy Bar, where we encamped; after partaking of some refreshment, we both went into the bed of the creek to see if we could find any gold. I looked about for a short time, and at length found a piece of gold worth about 2*l*.; I said to Mr Lister, "I have picked up one bit, however;" he laughed, and thought I was joking; however, I soon convinced him of the truth of what I had said. As soon as the excitement naturally produced by the circumstance was over, it was determined

between us that one of us should go over the mountains to fetch the rocker, while the other remained to clear away the stones from the spot we fixed upon; the next morning Mr Lister went for the rocker, and returned about eleven o'clock, and having cleared away the stones we carried the soil in two three-bushel bags to the rocker, and by night we had obtained about thirty shillings' worth of gold dust. We continued here for some days (four or five) till we procured what weighed eight sovereigns, then hid our cradle, caught our horses, and travelled down the creek, hoping to pick up some lumps.

31. How many days were you there?—We were eight days away, including the day of starting and the day of return.

32. During those eight days did you get any quantity of gold?—We effected the discovery of an available gold-field, and obtained gold weighing sixteen sovereigns.

33. Who were the parties that obtained it?—Mr Lister and myself.

34. Where was the gold procured?—Half at Fitzroy Bar, and the rest, in one piece, about a mile and a half lower down the creek.

35. Did you communicate the result of the search to Mr Hargraves?—Mr Lister was to write a letter to him as soon as possible, and Mr Hargraves acknowledges its receipt in a letter addressed to Mrs Lister, and dated 8th April. [*The witness handed in Mr Hargraves's letter.*]

36. *By Mr Cowper:* Mr Hargraves states that your name is mentioned in that letter by mistake, and that he did not receive a letter from you?—I did write a letter to him, acquainting him with the fact of our having obtained seventeen grains of gold; this fact *I am sure of*, and it is ostensible to my brother and John Lister, and Mrs Lister too.

37. *By Mr Bligh:* After you had communicated to Mr Hargraves the result of your expedition, did you do anything until Mr Hargraves came up?—No; but it was Mr Lister who acquainted him with our discovery of an *available gold-field.* Between the time I wrote to Mr Hargraves and the time Mr Lister wrote to him, Mr Lister and I made the *available gold-field discovery.*

88. Did you ever find any gold before Mr Hargraves visited that neighbourhood?—No, none of us ever found any.

89. Did you ever look for it?—Mr John Lister, as Mr Hargraves's letter shows, had been looking for it for some time before, and had gone out with two geologists in search of it.

90. What you know of the mode of searching for gold, you learned from Mr Hargraves?—Yes; he is fully entitled to the credit of having made us acquainted with the mode of extracting the gold from the soil, and also of having made one or two unsuccessful trips in search of an available gold-field.

106. *By the Chairman:* You think you were ill-used in not having some share of the reward which Mr Hargraves obtained?—Yes. I believe that Mr Hargraves made an unfair representation, and thereby got what would have fallen to us.

107. *By Mr Macleay:* A letter appears in the 'Bathurst Free Press' of January 1st, 1853, signed "J. H. Lister?"—That letter was indited by me.

108. In that letter the following passage occurs: "I do not mean to assert that the Messrs Tom and myself expected to get a share of what Mr Hargraves might obtain from the Government, or even in the shape of public subscriptions, but only of the profitable results of our exertions?"—That is true to the letter. All we expected was a fair representation, and then, if the Government had given him a thousand

pounds, we should have had no claim upon that; or if we had had a thousand pounds given to us, he would have had no claim to that.

WILLIAM CHARLES WENTWORTH, Esq., in the Chair.
(6th July, 1853.)

Mr John Hardman Lister called in and examined:

1. *By Mr Cowper:* You are one of the petitioners who have addressed the Council with reference to Mr Hargraves's discovery of the gold-fields?—Yes.

2. Will you state to the Committee what took place between Mr Hargraves and yourself when you first communicated together on the subject of the gold discovery?—Mr Hargraves first came to my mother's residence at Guyong, near Bathurst; he was an old acquaintance of my father's. At the time he came there my mother did not know him at first till he mentioned his name, when she knew him at once. During the afternoon, when I was introduced to Mr Hargraves, I became acquainted that he came from California, and that he was on his way to Wellington to see a Mrs Cruikshank—his cousin. Having been to look for gold I was anxious to obtain some information from him about it, and showed him several indications from the Upper Turon. He said that one piece of micaceous slate and quartz was the same as was found near gold mines, and he then proposed that I should find a pack-horse and different things and he would take me as himself.

3. When he arrived at your mother's house, did he not say anything about his being on his way to Wellington to search for gold?—He said he was on his way to see Mrs Cruikshank, his cousin, and that he thought this was a gold-field. I joined Mr Hargraves, and found a pack-horse and the requisite articles, and we proceeded down Lewis Ponds Creek and found, I think, five very minute specks.

5. *By the Colonial Secretary:* Who washed the gold?—Mr Hargraves.

6. Did you know anything about washing for gold before?—I had never seen anything of the kind before.

9. *By the Chairman:* Did he select the spot where the five specks were obtained?—He said if gold existed in the colony that was a likely spot. We got off our horses, and in the first pan we found a speck of gold. He said then that the only thing now was to discover a workable gold-field, and if that could be done it would be the luckiest day that had happened to New South Wales.

10. Do you recollect on what date that was?—The 12th February, 1851. He said if we could only procure gold he should be made a baron and I should be knighted. It used to be a regular joke with Mr Hargraves.

11. Did you proceed with the prospecting after that?—Yes. Mr Hargraves said we would require to make greater preparation and go a further distance.

13. *By the Colonial Secretary:* Were all the proceedings taken under Mr Hargraves's direction?—Yes. I was quite ignorant of anything of the kind till Mr Hargraves told me. I had dug several feet in several places at different times, and always felt a great anxiety on the subject. I always thought gold existed in quartz, but I never could find a speck.

14. You never found any till he showed you the way to discover it?—No.

15. Some gold had been found in that neighbourhood by a shepherd

sometime previously?—Yes, but I did not know it at the time I went down there with Mr Hargraves. Mr Hargraves said he had been down that creek about fourteen years previous, and had seen country like that in California.

16. You had dug for gold on the same ground two years previously? —I dug in a quartz-vein.

17. In the matrix?—I had understood that gold was to be found in quartz.

18. Was that from hearing of the success of Macgregor?—From what I read in the papers about California.

19. *By Mr Cowper:* You were accompanied by two geologists sometimes?—I was in company with young Neal.

20. You never made any discovery when in company with a geologist?—No. I had been with a geologist, Mr Batty, who had been at the rocks looking for gold several days.

21. You have stated in your petition that a proposal to join you was made to some of the Tom family—was that before you went to the Macquarie or afterwards?—On the way to the Macquarie Mr Hargraves and I proposed to leave the tarpaulin at Toms'. We called there and left the tarpaulin, and Mr Hargraves said the Toms knew the country very well, and he should like them to join us. I told him that if they did they would see the way of prospecting, and it would put them in the same position as ourselves. He said we could put them to hobble the horses. I said it was not likely a young man like James Tom would do anything of that kind, and he then said he would make them the same as ourselves. When Mr James Tom came I told him we had got gold in small quantities, and we now only wanted to get it in paying quantity. Mr Hargraves then said he should go as one of ourselves.

22. What did you understand him to mean by "one of ourselves?"—Mr Hargraves at the first outset, when I showed him the indications from the Turon, said, if you will join me and find the articles I require, I will take you with me, and whatever arises from the discovery we will share in it, and, said he, it will be a very handsome thing if we find it payable.

23. *By the Colonial Secretary:* Did he allude to the quantity of gold you could obtain by working, or anything of that sort?—He did not allude to anything in particular, but said it would be a very handsome thing.

24. What did you infer from that?—I thought we should find it in large quantities.

25. You expected no reward but in the large quantities of gold you would find by working!—I did not know what Mr Hargraves's intentions were.

26. *By Mr Cowper:* You stated in your letter in the Bathurst newspaper some months afterwards, that you had no expectation of sharing in the Government reward?—We always expected Mr Hargraves to represent our case favourably to the Government.

27. *By the Colonial Secretary:* Do you claim to be the discoverer of gold?—No, I do not, but one of the discoverers, and of a workable gold-field.

28. Who do you consider to be the discoverer of gold?—We are duly indebted to Mr Hargraves for the theory, but the Toms and myself are entitled to a portion of the reward for the discovery of a gold-field worth working. Had Mr Hargraves not joined me at the time he would most probably have gone on to Wellington.

35. *By the Chairman:* Where did you go after that?—We followed the Macquarie up to the junction of Summerhill Creek, and in almost every place we tried we found gold in very small quantity. Sometimes we washed three or four dishes and could not get a speck, but if we persevered we generally found a little, though we never found it in such quantities as Mr Hargraves thought would pay for working.

36. When you came to Summerhill Creek did you prospect there?—Yes, and it was the best place on the Macquarie. Mr Hargraves said he thought that in that place a party of eight or ten men, with long toms, the same as they use in California, could earn eight or ten shillings a day each; but he did not think that sufficient. We then followed the Summerhill Creek up till we came to the place now called Ophir. It was on a Sunday, and we never prospected on Sunday, but went home. We followed the Lewis Ponds Creek up, and Mr Hargraves said he should like to prospect the lower part of it.

37. *By the Colonial Secretary:* That was near its junction with Summerhill Creek?—Yes. We fixed upon a place, and Tom said Cooloombolla Creek was a very likely place, as there was a deal of quartz there. We followed the Cooloombolla down and prospected, but did not find anything. Then we came on to the Summerhill Creek, about two miles below the junction with Lewis Ponds Creek; we prospected in three or four places, but did not procure any gold.

38. *By Mr Bligh:* Is that the place called Ophir?—Yes.

39. *By the Colonial Secretary:* You called it Fitz Roy Bar?—That is the place; but the Fitz Roy Bar is rather below the waterhole at the junction. Then, when we were going up the creek, Mr Hargraves said he would like to go where we first found gold, and we might get four or five dollars' worth. We washed four or five pans, but he said it would not pay. We then proceeded on the way home, and Mr Hargraves then said that James Tom and myself had better go to the Turon, and he would go up to Dubbo. Myself and Mr Tom went to the Turon, and found granular gold in greater quantity than in any other places except the junction of Summerhill Creek with the Macquarie. On our way up we prospected at the place Mr Hargraves said he would like to try at Summerhill Creek, and there found from thirty to forty very fine specks in a tin dish. When we got home Mr Hargraves had not arrived from Wellington; but when he returned we told him of it, and he then told us to make a cradle, which he directed us how to do, and give it a day's trial. Mr Tom went down the creek and tried it with a cradle, and only procured about sixteen grains in the day. Then Mr Hargraves and myself went to Campbell's River and the Fish River, we found no gold on the Fish River, and Mr Hargraves said he did not think it contained gold. He then left me, and said, if we would go on to the Macquarie and the Cudgegong Rivers and prospect there, he would go to the northward, and if either party succeeded in finding gold we should write to the others.

40. *By Mr Bligh:* What did he mean by the northward?—To the northward of Port Stephens. When I wished Mr Hargraves good bye, he expressed a great desire that, in case neither of us should succeed in finding gold in paying quantity, I should go to California with him.

62. *By the Colonial Secretary:* Did you consider yourselves entitled to share in the reward?—We considered that Mr Hargraves would represent our case fairly to the Government; but we did not expect to receive the same reward as Mr Hargraves.

63. You considered you had a claim independent of that of Mr Har-

graves?—Yes; for finding a place worth working, and joining Mr Hargraves in the first outset, as he might not have found gold had he not joined us.

64. How did Mr Hargraves prospect?—He went to the bed of the creek and took the top soil off; he said he could always tell from the top soil what lay underneath. I often wished him to dig deeper.

65. *By the Chairman:* Did you get the four ounces by sinking, or from the top soil?—By sinking. The piece that Mr William Tom picked up led us to try in that place.

66. *By the Colonial Secretary:* Mr Tom found the largest piece on the surface?—Yes, and then we worked under the place, thinking it would be the best; we worked two or three days.

68. *By Mr Macleay:* Did Mr Hargraves point out that particular place on Fitz Roy Bar?—No; we wished to sink at the junction of the waterhole, but he would not.

69. Had he suggested that the junction of the two creeks was a likely spot?—No.

70. Had he ever recommended you to go to that particular place?—No.

71. It was a suggestion of Mr Tom's?—Yes; he proposed to stop there.

72. *By the Chairman:* After you discovered this gold what was the result—did other people go and dig there?—When Mr Hargraves had the gold put in his possession my mother wished him to show it to Mr Arthur and Dr Machattie; instead of that he showed it to every one and afterwards sent it to Sydney by Mr Icely.

73. Did you go and dig any more?—Not till we got permission from Mr Hargraves to do so.

74. *By the Colonial Secretary:* Did you think it necessary to apply to Mr Hargraves for permission to dig?—Mr Hargraves said he had authority from the Government to make his researches.

75. *By the Chairman:* He gave you permission, in writing?—Yes, with the understanding that the Government had autherised him.

76. When you got this permission did you go back to Fitz Roy Bar?—Yes, and prospected the creek for some miles down it.

77. Did you get any more gold?—Yes, several ounces.

78. *By Mr Bligh:* At that time other people went as well as you?—Hundreds. We tried to keep them off, but could not.

90. *By Mr Macleay:* Before you applied to him, did he not state that he had got some authority?—He stated he had so much authority that he was promised an appointment from the Government. What the appointment was I did not know; but he said if he gave us this, the Government would not meddle with us.

91. *By Mr Macarthur:* Did he say that he had a positive promise, so that if he succeeded he would get an appointment?—He said he was promised an appointment.

95. Do you recollect the circumstance of a letter being published in the 'Bathurst Free Press,' purporting to be signed by you?—Mr Hargraves wrote a letter, and wished me to sign it, disclaiming all credit or honour attached to the discovery, and I would not do it.

101. You refused to sign that letter? *(Mr Hargraves's draft of the letter in question handed to witness.)*—Yes, that is the document which Mr Hargraves gave to me, and asked me to copy it, and send it to the 'Herald.'—(See copy subjoined.)

105. *By the Colonial Secretary:* You had never assumed the credit

of having made the discovery ?—Not the sole credit; I always gave Mr Hargraves his due.

106. *By the Chairman:* What merit is it you claim. Is it the merit of having discovered gold in the first instance, or of having discovered a workable gold-field in New South Wales ?—The merit of having discovered a workable gold-field.

110. *By the Colonial Secretary:* Do you think you could have found that workable gold-field if you had not been taught by Mr Hargraves the manner of prospecting and the places likely to be auriferous ?—If we had not obtained the knowledge from Mr Hargraves, of washing with a tin-dish, we should not have done it, for we were quite ignorant of the method of washing until he put us in a position to go to work.

111. *By the Chairman:* Has Mr Hargraves, to your knowledge, ever found any quantity of gold since he has been appointed Prospecting Gold Commissioner ?—I have never seen anything in the papers that he has ever done, and if he continued prospecting in the way he did, he never would.

117. *By Mr Bligh:* Mr Hargraves did not go to the Turon, did he ?—No. At the time he reported on the Turon he had never been on it, not to my knowledge.

118. You and Tom had been there ?—James Tom and I. When Mr Hargraves was returning to Sydney, I wished him to go to the head of the Turon, but he had important business, and could not stay.

119. *By Mr Macleay:* You suggested the Turon as a probable gold-field ?—Yes; I always said so.

120. *By the Colonial Secretary:* Was that before or after you discovered gold at Summer-hill Creek ?—Afterwards.

121. Was the inference drawn by you that the Turon was a gold-field from the similarity of its geological construction to that of Lewis Ponds Creek ?—Yes. Mr Hargraves told me always to look after red soil and quartz and micaceous slate.

122. It was from his description of a gold country that you inferred the Turon was a gold-field ?—Yes, and from having been there looking for gold two years previously.

137. *By Mr Macarthur:* Where was Mr Hargraves at the time you prospected the Turon ?—We were waiting for his return from Wellington.

138. Did you separate from Mr Hargraves previously, or did he go part of the way with you ?—He left us to go to Wellington, and we went to the Turon.

139. Did Mr Hargraves at any point on the journey see the Turon country ?—He might have seen the junction at a distance of nine or ten miles, but he could not have told the character of the country.

145. *By Mr Macleay:* Was Mr Hargraves exposed to much fatigue and danger, as he states in his letter ?—We had some difficult places to pass on the Macquarie.

146. *By Mr Cowper:* Was he with you when he endured "many days and nights of extreme hardship," as is stated in your petition ?—He was always with me, except on the Turon, and when we made the discovery of a gold-field worth working. It is a very dangerous and rough country, and to follow the Macquarie up is a difficult matter.

147. *By the Chairman:* You say Mr Hargraves asked you to go back to California with him if he did not succeed in his explorations here ?—He wished me to go.

149. Did any conversation between you and Mr Hargraves lead you to

the impression that if you and the Toms's had not discovered the four ounces of gold, he would have gone back to California?—I believe he would, if his friends had not advised him to show the small specks to the Government.

151. He did not consider that they indicated a sufficient quantity of gold to pay for working?—Not at all. He considered no place he had seen worth working, except the junction of Summer-hill Creek. He said he thought a party of eight or ten men working together with long toms might make eight or ten shillings a-day each there. He did not wish the discovery to be made known, as it would cause a great deal of disturbance if it would not pay for working.

152. You say he expressed an intention of returning to California before the winter set in—did he mean the winter in California or here? —Before the winter thoroughly set in in this colony, so that he might arrive in California in summer.

153. This was in the mouth of May, and the winter was setting in? —He was going to the northward. He thought he would be about a fortnight or three weeks to the northward, and if he did not succeed he would go to California.

155. *By the Colonial Secretary:* You say he received certain advice from friends in Sydney to show to the Government the specks of gold he had obtained?—He received advice from his friends to show them to the Government, and just after he had shown them he received my letter to say that we had discovered a workable gold-field.

157. *By Mr Bligh:* Was it after the discovery of the four ounces by you, that he announced publicly at Bathurst that there was a workable gold-field in the neighbourhood?—Yes.

(True Copy of a Paper given by Mr Hargraves to Messrs Lister and Toms on their application after obtaining four ounces of gold.)

On Her Majesty's Service.

This is to certify, that the Australian Gold Company are hereby authorised and empowered to occupy the following Bars, for the purpose of experimenting in gold-mining, and to prevent all parties from intruding thereon, viz.:—Fitzroy's Bar, Hargraves's Bar, Lister's Bar, and Tom's Bar. (Signed) E. H. HARGRAVES.

Ophir, 6th May, 1851.

Copy of Letter exhibited to the Committee, which Mr Lister refused to sign, the letter having been drawn up and written by Mr Hargraves for insertion in the public prints.

Ophir, 19th May, 1851.

GENTLEMEN,—A report having been spread abroad by some malicious person, who evidently is jealous of Mr Hargraves's great discovery, to the effect that I was the party who made it and communicated it to him, I beg leave most unreservedly to contradict this false report, although having been upwards of two years searching for it, at one time with two geologists and mineralogists, who told me that there were indications, but could not find the gold. Mr Hargraves, during his explorations, called on me, as an old friend of my late respected father, and in course of conversation he told me that this was a gold country, and if I would keep the secret, he would combine with me. This I agreed to. He was as good as his word, and scarcely ever made a failure. Where he said gold was to be found, he found it. I neither understand geology nor mineralogy; but I am convinced my friend Mr Hargraves knows where and how to find gold; and all honour and reward in the late discovery belongs to him alone. Indeed, few men would have done what he has—intersecting the country with blacks—sometimes alone—sometimes with my friend Mr James Tom—and during his explorations, had rain set in, from the imperfect manner in which we were equipped, starvation and death must have been the result.

Trusting that you will give this publicity in the columns of your valuable journal, I am, &c., JOHN HARDMAN LISTER.

P.S.—I have also heard it reported that Mr Hargraves had not acted fairly towards me. I beg most distinctly to state, that in all transactions with that gentleman, he has acted strictly honourable with me and friends in the secret of the great discovery. Mr Hargraves is now no longer connected with me or my party at Ophir, and wherever he may be he has my best wishes and, I believe, of all who know him in the district of Bathurst.

WILLIAM CHARLES WENTWORTH, Esq., in the Chair.

(27th July, 1853.)

Present: The Colonial Secretary, Mr Bligh, Mr Cowper, Mr Finch, Mr J. Macarthur, and Mr Wentworth.

EDWARD HAMMOND HARGRAVES, Esq., called in and further examined:—

1. *By the Chairman:* There are a few supplemental questions which the Committee wish to ask you in addition to your former evidence. Since you were examined, we have had Mr Lister before us, and one of his statements to the Committee was to the effect that, when you and he parted at Bathurst, after having been prospecting together, you left with an intention to go somewhere to the northward, and that you intimated your intention to return to California if you did not find gold there—Is that true or not?—I cannot recollect the precise words I used, but to the best of my recollection I told him that I had very important business in Sydney, and I could not remain with him any longer. I believe he came a few miles on the road with me. I did not then tell him that I intended returning to California, but I recollect saying, *when I first went there*, that if I was not successful in my search for gold I intended to do so.

2. Do you recollect saying anything about prospecting in the northern district?—No, I do not; but I might have done so, because I went a short distance to the northward while waiting for the Colonial Secretary's letter.

3. Mr Lister has also led the Committee to infer that if he and the Toms had not discovered the four ounces of gold which they found after you and he parted, you would not have gone back to Bathurst, but would have returned to California?—Three or four days after I left Mr Lister I waited on the Colonial Secretary, and explained all the circumstances connected with my discovery, and at his request communicated my views on the matter in writing, which will clearly explain what my views and opinions were at the time. You have documentary evidence on this point.

4. I believe the small quantity then brought down by you was not considered worth the attention of the Government?—Certainly it was

considered worth the attention of the Government, and they entered into negotiation with me. My claim is grounded on my letter of the 3rd of April, 1851, after having had three interviews with the Colonial Secretary. I never remained to dig gold for profit. What I brought down was sufficient to prove the fact of the existence of gold, and I explained to the Colonial Secretary that I believed it would turn out to be as good a gold-field as many portions of California which I had seen. It was a very dry season, and there was no water over the greater part of the country; and had there been water it is not likely I should have stopped to dig. I had dug enough in California. I came here to make the discovery, and when made, considered my mission at an end.

5. A portion of Mr Lister's evidence is to this effect: that the most prolific place you prospected at was the junction of the Summerhill Creek with the Macquarie River, and that it was your opinion that even there a digger could not get above ten shillings a day?—Fifteen shillings a day was the sum I pronounced might be got on Lewis Ponds Creek; I told Mr Lister it would pay fifteen shillings a day when worked, and I considered it a workable gold-field.

6. Was it your opinion, that only ten shillings a day could be got by diggers at the junction of the Summerhill Creek and the Macquarie?—I do not remember expressing an opinion upon that particular locality. I wrote to Mr Icely, stating that some portion of the Lewis Ponds and the Macquarie surfacing would pay from seven to ten shillings a day—I was speaking of a particular portion of the country; my letter was marked private and confidential. I mentioned I was fearful, if the fact was known and believed, that it would induce labourers to leave the more useful occupations and resort to the gold-field, and create much inconvenience in the labour market. My letter was dated about the 20th of February, 1851.

11. What answer can you give the Committee on this point? Was not the gold discovered by the Toms and Lister, and of which you obtained possession of them, the cause of the rush to Ophir?—No; there was a hundredweight found, a few days afterwards, by a black-fellow employed by Dr Kerr, on the surface.

12. That was some time afterwards?—What I maintain is, that had I not made the discovery in the first instance, and brought it openly before the public, the one hundredweight of gold would not have been discovered.

13. I suppose the discovery of the four ounces of gold was the cause of the rush to Ophir?—No, I cannot say that it was. I had drawn attention to Summerhill and Lewis Ponds Creeks, and requested many parties to go there, assuring them they would find gold, and be repaid for their labour.

14. Was there any general rush to Ophir before that gold was obtained?—When I arrived at Bathurst I directed attention to the locality.

15. It was after you got these four ouces of gold from the Toms and Lister, and when you were able to exhibit it, that you gave that lecture at Bathurst?—It was when I went up to point out the gold-field to Mr Stutchbury.

16. That was after the four ounces of gold were obtained?—There was a great deal of gold raised at that time. I believe gold to the value of 1,000*l*. was raised the very day I was there.

17. Was there any rush to the diggings before these four ounces of gold were obtained? There was no rush to the diggings until I drew

attention, and requested parties to go there, assuring them of finding gold.

18. *By Mr Macarthur :* Was it after the receipt of the letter, informing you of the finding of the four ounces, that you went to Bathurst ?—Yes ; I was on my way there at the time.

20. What took you there ?—I went by desire of the Government. I wrote to the Colonial Secretary, stating that I was prepared to prove the value of my discovery ; when he told me that my reward must depend upon its nature and value. I asked how I was to prove it, and I was instructed to proceed to Bathurst to point out the gold-field to Mr Stutchbury.

21. Did you then learn that four ounces of gold had been found by the Messrs Tom and Lister ?—It had been got before. I received a letter from one of them informing me of it, and I showed the letter to the Colonial Secretary.

22. I suppose it was this circumstance that partly induced you to go to Bathurst ?—It was not.

23. You went to Bathurst then to prove to Mr Stutchbury that there was a gold-field ?—I did. The finding of this four ounces of gold did not in any way influence my proceedings ; it was a natural result anticipated by me after I had discovered the gold, made a cradle, and instructed my guides how to use it. I told the Colonial Secretary that I had instructed these parties to obtain specimens for me, and on the receipt of their letter took it to him. My arrangements with the Government had been previously made.

25. The Toms themselves admit that they would not have found this gold if you had not shown them how to get it ; they do not try to take from you the merit of having discovered the gold in the first instance, but they claim the merit of having been the discoverers of a workable gold-field. When you got to Bathurst, you found that gold had been discovered in sufficient quantities to enable you to afford the Government that proof which they required ?—I had proved that to my own satisfaction before I went down to Sydney and satisfied the Government, who then made an agreement with me.

26. Do you mean by the few particles you brought down the first time ?—Yes ; my letters and my interviews with the Colonial Secretary will prove what my impressions were. I only wanted a number of people to prove the field. I told the Colonial Secretary this.

27. Did the Government then admit that you had produced sufficient gold to establish the fact of the existence of a workable gold-field ?—Yes, the Colonial Secretary admitted that. He said, " If what you say is correct, Mr Hargraves, we have got a gold-field ; it will stop the emigration to California, and settle the convict question."

30. How did you propose to furnish proof that you had discovered a gold-field ?—I received a letter from Mr Stutchbury ; I was told to point out the gold-field to him, and I said I would take the cradle down and go to work in the usual way.

32. But it had been tested before you reached Ophir ?—Yes ; it was tested before I went away. I said here is the gold ; whether it is a rich or poor gold-field, it is impossible to say until it is proved by working. The Colonial Secretary gave me a letter to Mr Stutchbury, and told me to go and prove it. I went up with the intention of doing so ; and, as I went down to Ophir, I called the attention of many people going along the road to the discovery, and I got hundreds of people there, and everything proved it at once.

36. Did you not find a good many people at the mines when you arrived there ?—Yes ; I think there were thirty or forty.

38. Was it not the gold which the Toms discovered that induced the people to go ?—No ; because when I arrived, the Toms were anxious to keep the thing secret, and that I should join with them and keep the matter private. I said the only thing that would develop the resources of the gold-field would be to have a large population upon it, and new discoveries would be made ; and that it was a folly for them to think they could obtain more gold by keeping it secret, as every Californian in the country understood the process of gold-washing.

41. *By the Chairman :* You had then in your possession the three or four ounces of gold the Toms found ?—Yes.

42. Did you make the announcement you speak of before or after you got that gold ?—Afterwards.

43. *By Mr Cowper :* You alluded in your former evidence to a letter which you mentioned you had writen to Mr Peek, of Sydney, from California, in expressing the views you then had on the possibility of a gold-field existing in this colony ?—Yes. The following is an extract from that letter. which is dated San Francisco, 5th March, 1850 (see page 42).

44. *By the Chairman :* How was it that when you and the Toms were prospecting together you never prospected except on the surface ? —My object was merely to prove the existence of gold ; and, if I had commenced to work, the fact would have been spread about, as there were many Californians in Bathurst, and that would have defeated my intention, which was to obtain a reward from the Government for the discovery.

45. Then it was your intention from the beginning to apply to the Government for a reward, in case of your discovering gold ?—That was my intention before I started from California.

46. That was the reason why you confined your prospecting to materials collected from the surface ?—I did not think it necessary to do more. I knew it would require a number of people to test the value of the discovery. I might have worked, perhaps, two or three days without obtaining half an ounce of gold, though within a foot of the same place I might have got pounds. I looked upon my visit then as a mere preliminary step.

47. Was it not more likely to be proved whether it was a gold-field by sinking a little ?—Yes, of course ; but that was not my object. I did all I considered necessary ; I proved the fact of the existence of gold over a great extent of country. I explained everything connected with my discovery to the Colonial Secretary in my three interviews between the 20th of March and 1st of April, 1851, and communicated my views in writing on the 3rd of April, and personally requested an early answer, which I stated I was anxiously awaiting.

51. Are there any persons whose testimony you would wish to be given before the Committee in respect to your particular claims upon the Government ?—I did express a wish to have some witnesses examined, but that was under the impression that the fact of my having been the discoverer of gold was disputed. But now I am at a loss to know why I have been brought before the Committee.

52. *By the Colonial Secretary :* It has been stated broadly by the Messrs Tom and Lister, that but for their exertions a workable gold-field would not have been discovered ?—That is not the fact. These parties merely laboured under my instructions, having

been assured aforehand of the results, and such results as I predicted came to pass. I am at a loss to know what I am brought here for.

The Honourable EDWARD DEAS THOMSON, Esq., Colonial Secretary, examined :

1. *By the Chairman :* Will you be good enough to state what conclusions were drawn, and what steps were taken by the Government, when Mr Hargraves came down from Bathurst with his first few particles of gold, and reported his discovery to the Government?—As far as my recollection serves me, the first time I had any communication on the subject from Mr Hargraves was about the middle of March, 1851. I knew that the Council was then sitting, and I was very much engaged. I therefore told him that I was so much engaged that I could not then give my attention to the matter, but as soon as the Council was prorogued I would hear what he had to say. He then produced a paper containing a few very minute specks of gold, which were, I would say, scarcely visible, and I thought this was certainly not very promising as indicative of a productive gold-field ; but I thought that perhaps on its being thoroughly worked, it might prove to be so. Mr Hargraves stated, as far as my memory serves, very confidently that he considered there was a very large extent of country here that was auriferous, and would hereafter prove highly productive. He observed that he was induced to say so from having made observation in California of the gold-fields there. He stated at the time that he was willing to indicate to the Government the locality were this gold was found on being promised a reward. We had a similar application from a Mr Smith, in 1848, and a similar answer was returned to Mr Hargraves,—that no specific reward could be promised to him, but that His Excellency the Governor-General could not then say more "than that the remuneration for the discovery of gold on Crown land must entirely depend upon its nature and value when made known, and be left to the liberal consideration which the Government would be disposed to give it." That letter was dated the 15th April, and on the 30th April Mr Hargraves wrote to state that he was "satisfied to leave the remuneration for his discovery of gold on Crown land to the liberal consideration of the Government," and he pointed out the following localities, viz. : "Lewis Ponds and Summerhill Creeks, Macquarie and Turon Rivers, in the districts of Bathurst and Wellington," as the spots where gold would be found. Then I find that early in May, Mr Hargraves having in the meantime proceeded to Bathurst to make further explorations, transmitted to me through Mr Icely, certain further specimens of gold that had been found since his last visit. These specimens were of three different descriptions ; there was grain or scale gold, nuggety gold, and also a small nugget, weighing about an ounce. I produce these specimens for the inspection of the Committee. These are all the original specimens that were exhibited, excepting the small particles I have previously alluded to. I showed these specimens to an American gentleman who had been employed, he told me, for two years in gold-mining in California. He was particularly struck with the great resemblance of the specimens to Californian gold, and described the grain or scale gold as similar precisely to that which was found at the Yuba River. He also described the nuggety gold as similar to that which was found at the south fork of the Feather River, and the small nugget to be like the gold found at the north fork of the Feather

River. In fact he seemed impressed with the opinion that these were not specimens of New South Wales gold, but specimens of California gold, and I scarcely knew what to think myself of the matter on receiving such an opinion, having then no knowledge of Mr Hargraves's character. However, when I discovered, very shortly afterwards, that they were genuine specimens of New South Wales gold, I was strongly impressed with the opinion that as they were so entirely similar to the description of gold obtained at California, there was every probability that the gold-fields here would prove equally extensive and equally productive. All the subsequent proceedings of the Government in reference to the management of the gold-fields were accordingly based upon this supposition, which very rapidly proved to be well founded. After Mr Hargraves's return to Sydney, he again called upon me, and he certainly then stated his opinion, if he did not do so at an earlier period—and I cannot say positively whether he did or not, that the gold-fields in New South Wales were equally extensive with those of California, and that he had no doubt, from his observation, that they extended over hundreds of miles.

2. That was after his second visit to Sydney?—I think it was after his second return, but I am not quite certain. I kept no memoranda of conversations of that kind, and it is very difficult, at this distance of time, to recollect with any precision what then took place.

3. As a matter of fact, supposing Mr Hargraves had not produced anything but those minute particles which he brought down the first time, would the Government have paid any attention to him, or have considered him entitled to any reward? --If the matter had never gone further, undoubtedly not. The reward, in fact, was conditional on the success and value of the discovery.

4. He says he went to Bathurst the second time in order to give the Government some proof that there was a workable gold-field? —Yes.

5. What were the proofs the Government required?—The proof the Government desired was the report of the Government geologist upon the subject. When Mr Hargraves went back he was desired to place himself in communication with Mr Stutchbury, and to point out to him the localities where gold was to be found, and we called upon Mr Stutchbury, as a Government officer, to make the necessary report, to satisfy the Government as to the existence of gold.

6. Did Mr Hargraves apprise you that the Messrs Tom and Lister had discovered the specimens you have now exhibited to the Committee?—No, he did not tell me they had discovered the gold: on the contrary, I understood that he claimed to be the discoverer himself, but he said he was working in conjunction with them, and, as far as I recollect, he showed me a letter from one of them, and read an extract from it, showing that gold had actually been obtained, and he drew inferences from that, that the gold-field at Ophir, where they were then working, was exceedingly productive.

7. Can you state what is the date of the letter addressed by the Geological Surveyor to yourself at page 12 of the Papers relative to Geological Surveys?—It was dated the 14th May, 1851. Mr Hargraves subsequently transmitted to me, with a small specimen, which I now produce to the Committee, the original memorandum that he made on the day on which gold was first discovered. It is dated Wednesday, 12th February, 1851, and is as follows: "Discovered gold this day at (blank in orig. MS.); named the Diggings Hargraves, who was the

first Discoverer in New South Wales of the metal in the earth in a similar manner as found in California. This is a memorable day." That is the original memorandum made at the time.

8. And which he sent with his last nugget?—Yes. The nugget was one which was discovered at an early period at Ophir. It appears from that memorandum, at all events, that he was himself favourably impressed at that time with the importance of the discovery.

9. The Government would not have paid any attention to Mr Hargraves's claim for reward, if a workable gold-field had not been discovered?—Certainly not, for the very terms proposed by the Government were, as already stated, that the reward should depend upon the importance of the discovery.

10. And he was referred by the Government to Mr Stutchbury, to prove to him that such a gold-field existed?—Yes, and the result was that Mr Stutchbury reported that, undoubtedly, a workable gold-field had been discovered.

11. The first few specks exhibited to you were not thought worthy of any notice?—I can scarcely say that. The matter was considered worthy of notice, for we were willing to have it further tested; but the fact of the existence of a productive and workable gold-field was by no means considered as proved.

12. And if the matter had rested there, no claim to any reward would have been admitted?—Certainly not. Mr Hargraves would not have been entitled to any reward if no more gold than the first few specks he produced had been found; but I consider him as the discoverer of gold, and that the many millions that have since been raised in these Colonies might, without his knowledge of the secret, have remained undisclosed for a number of years, though, no doubt, the existence of gold-fields would eventually have been discovered.

13. Do you not think the Committee ought to take it into consideration whether the discovery was made by the labour of his own hands or by the work and labour of other people?—I do not consider that the subject ought to be judged of in reference to the work and labour at all. I think the discovery depended entirely upon the knowledge of gold-mining which Mr Hargraves acquired in California. That knowledge enabled him to point out to the Messrs Tom and Lister the place where gold was likely to be discovered, and the mode of working for it, and having been instructed in that way, they obtained the quantity of gold which has been referred to.

14. Suppose the Toms had taken no further trouble, and Mr Hargraves had returned to California?—If Mr Hargraves, and no one else, had worked it out, the matter would have fallen to the ground; but it is to be presumed that, being so strongly impressed with the idea that there was a productive gold-field here, if the Toms and Lister had not assisted him he would have applied to some one else. Seeing the enormous importance of the discovery—an importance which it is impossible to describe in all its ramifications—I have since seen reason to think that the reward proposed by the Government is an inadequate one.

15. Admitting that Mr Hargraves is the real discoverer of gold, do you not think the colony most benefited should be the largest contributor to his reward? Do you think this colony is bound to reward him for the twenty millions raised in Victoria?—I do not; but I think New South Wales has benefited almost in an equal degree with Victoria, by the quantity of gold obtained there. But for the quantity of gold got there the price of land, stock, and everything, would not have been

raised in the extraordinary way they have been. I think it would be nothing but right that a portion of the reward should be paid by the colony of Victoria; and I dare say, if it were put in that light, the Government and Legislature of that colony would consent to do so. No doubt that colony has been benefited much more largely than even this colony.

16. *By Mr Cowper:* When Mr Hargraves came back from Bathurst, did he seem to entertain any doubt as to the existence of a gold-field? —I do not think that in any of his interviews with me he expressed the slightest doubt of it. I have a strong impression that he endeavoured to impress upon the Government the great importance and extent of the discovery.

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